

Fig. 1
Prior Art

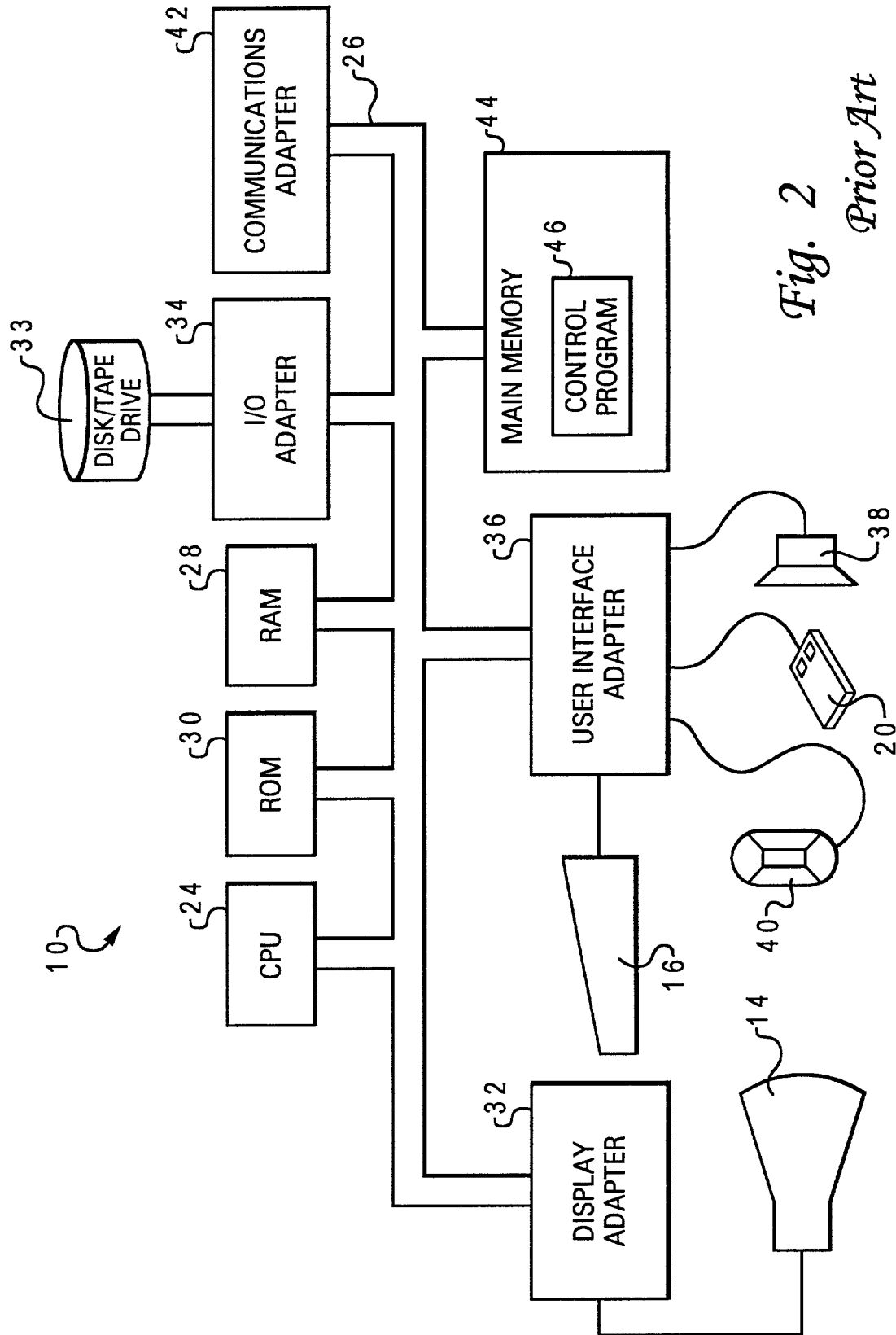


Fig. 2
 Prior Art

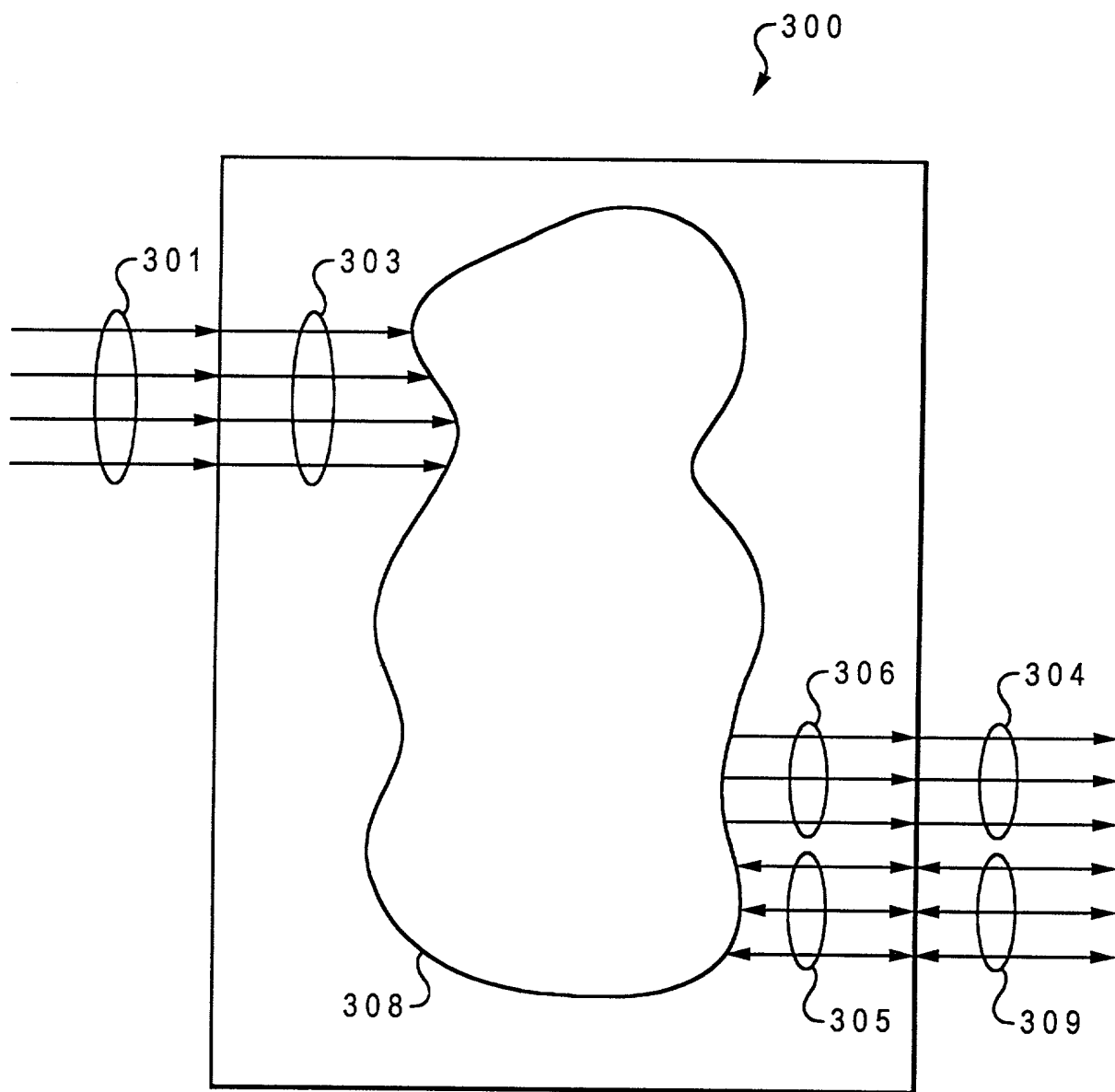


Fig. 3A

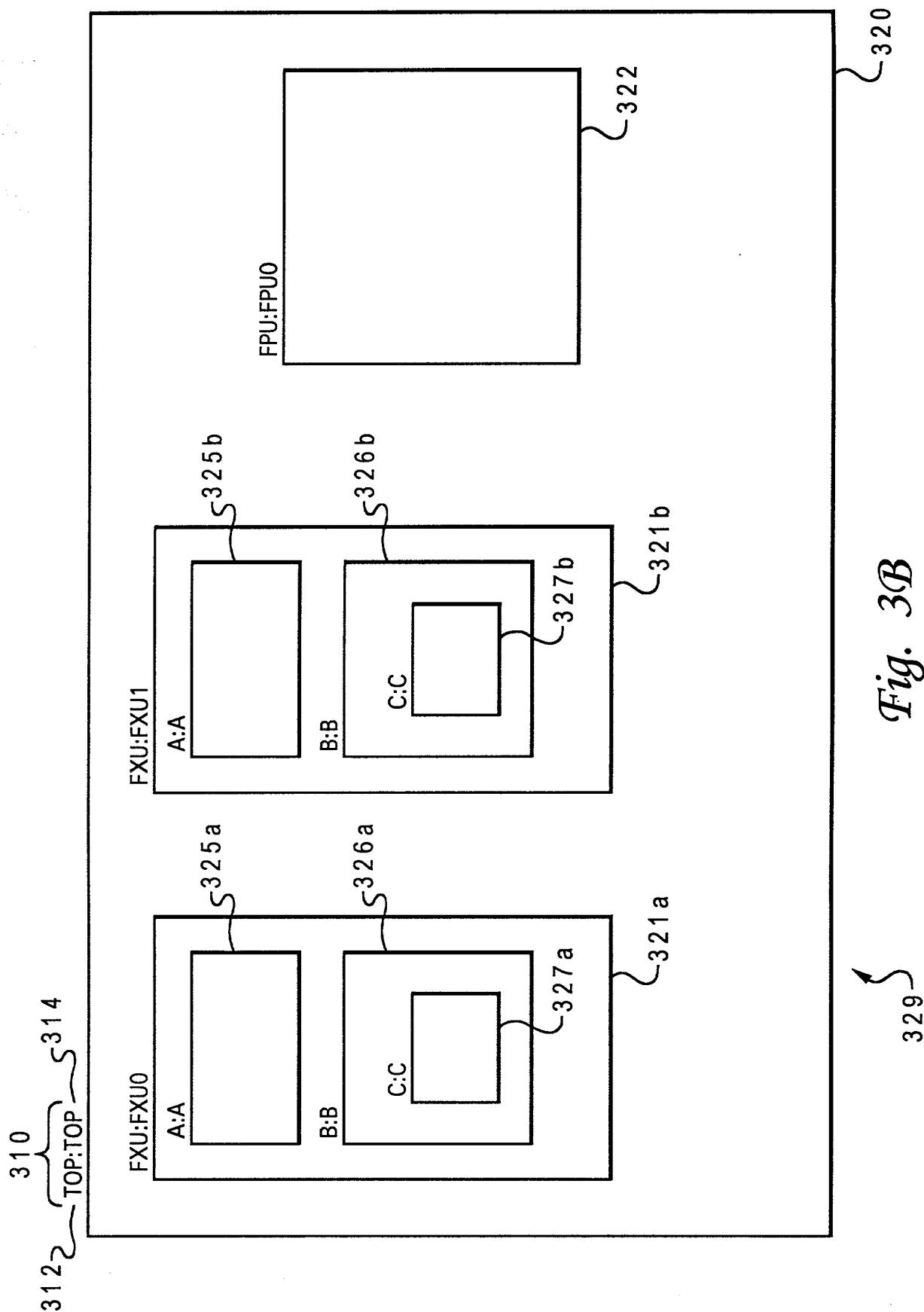


Fig. 3B

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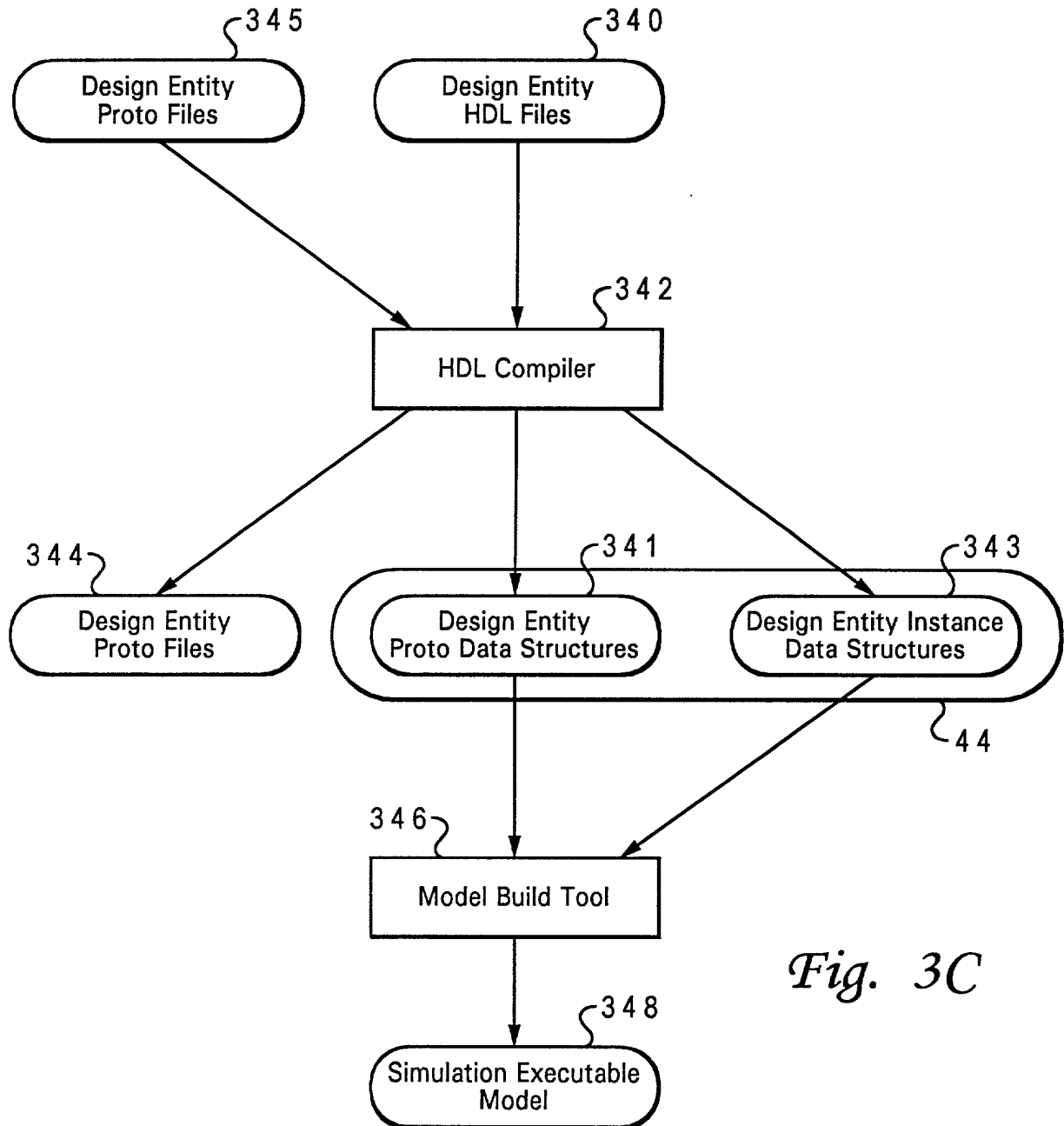


Fig. 3C

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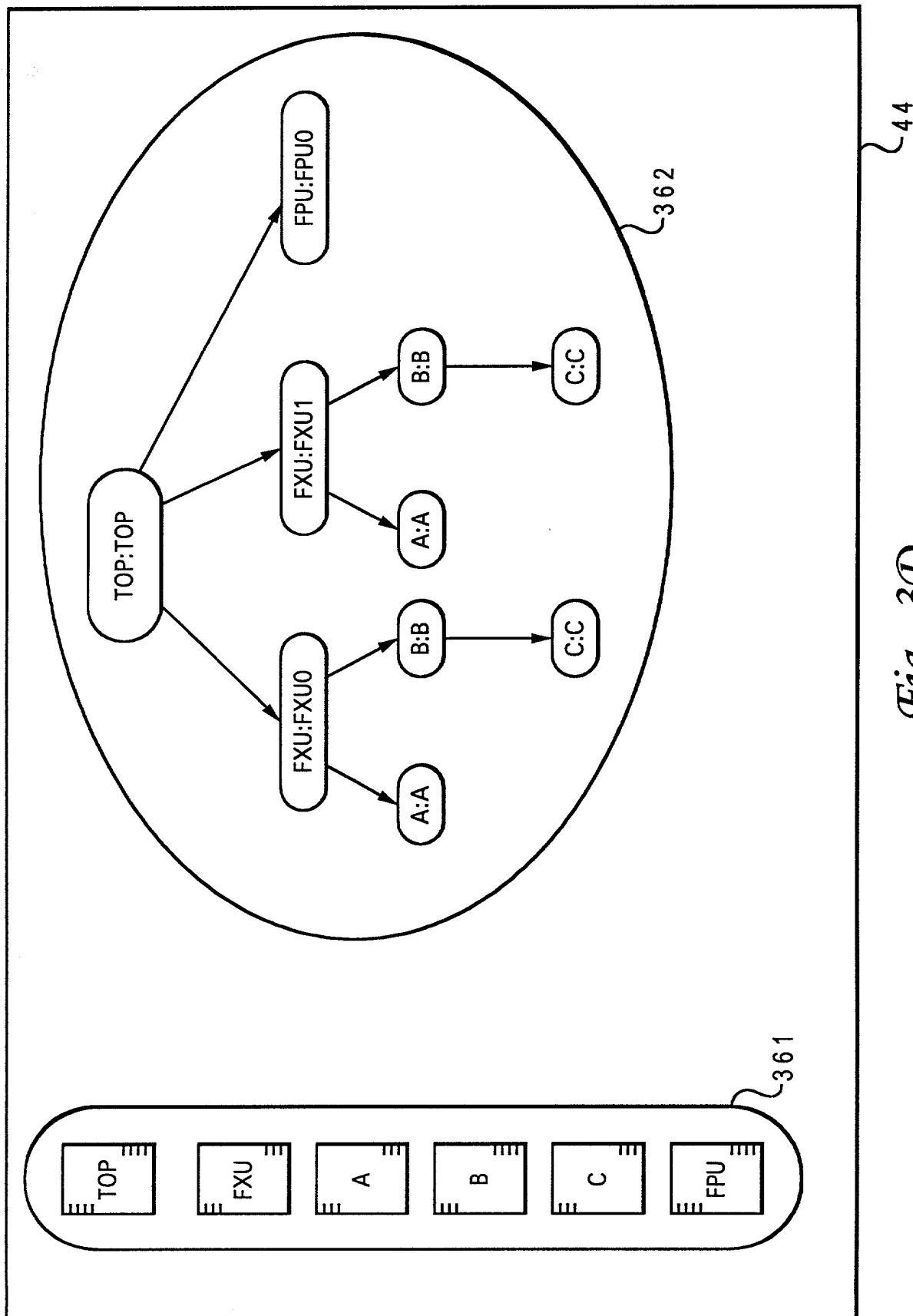


Fig. 3D

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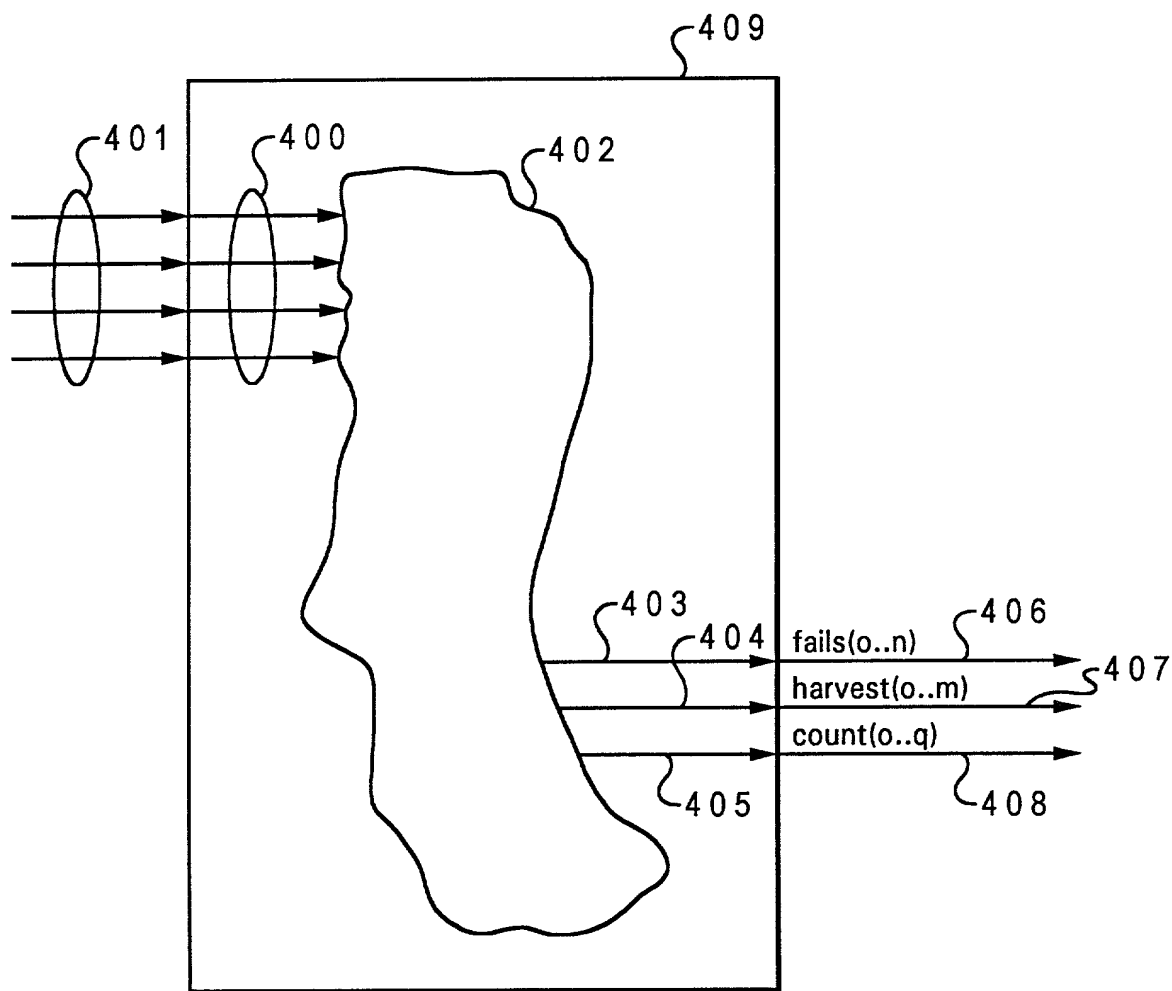
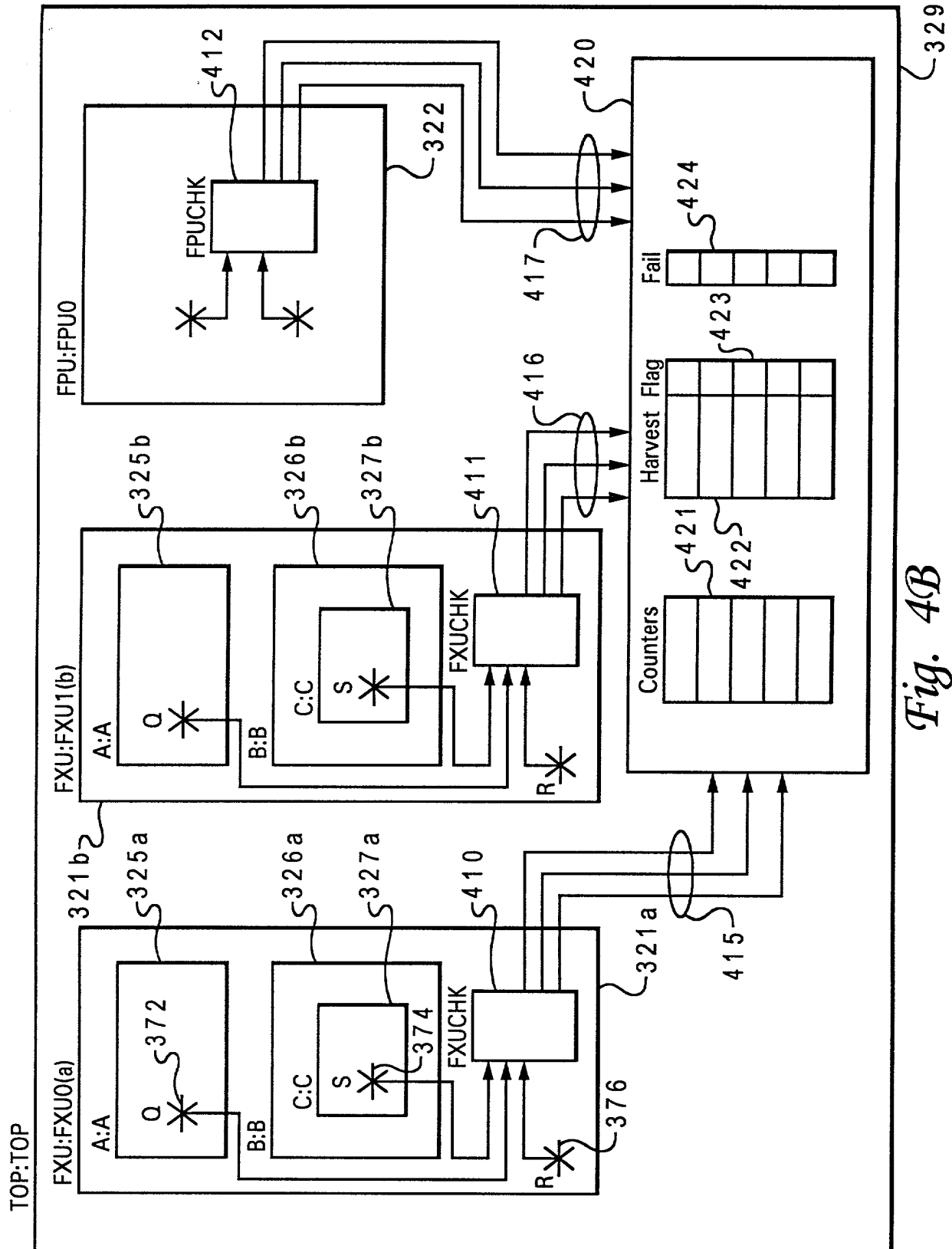


Fig. 4A

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ENTITY FXUCHK IS

```

PORT(  S_IN      :    IN std_ulogic;
        Q_IN      :    IN std_ulogic;
        R_IN      :    IN std_ulogic;
        clock     :    IN std_ulogic;
        fails     :    OUT std_ulogic_vector(0 to 1);
        counts    :    OUT std_ulogic_vector(0 to 2);
        harvests  :    OUT std_ulogic_vector(0 to 1);
);

```

4 5 0

4 5 2 { --!! BEGIN
--!! Design Entity: FXU;

4 5 3 { --!! Inputs
--!! S_IN => B.C.S;
--!! Q_IN => A.Q;
--!! R_IN => R;
--!! CLOCK => clock;
--!! End Inputs

4 5 4 { --!! Fail Outputs;
--!! 0 : "Fail message for failure event 0";
--!! 1 : "Fail message for failure event 1";
--!! End Fail Outputs;

4 5 5 { --!! Count Outputs;
--!! 0 : <event0> clock;
--!! 1 : <event1> clock;
--!! 2 : <event2> clock;
--!! End Count Outputs;

4 5 6 { --!! Harvest Outputs;
--!! 0 : "Message for harvest event 0";
--!! 1 : "Message for harvest event 1";
--!! End Harvest Outputs;

4 5 7 { --!! End;

4 5 1

4 4 0

ARCHITECTURE example of FXUCHK IS

BEGIN

... HDL code for entity body section ...

END;

4 5 8

Fig. 4C

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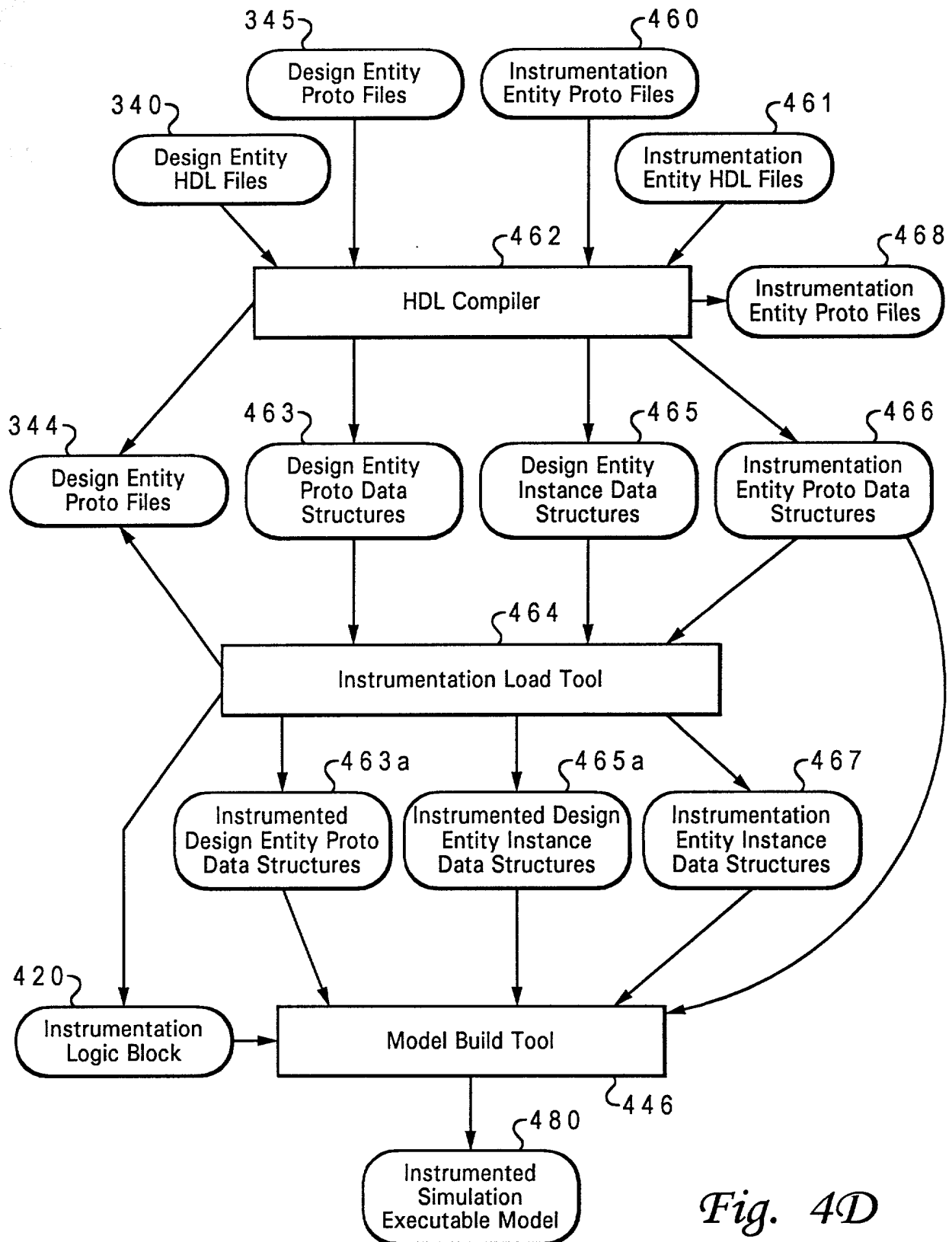


Fig. 4D

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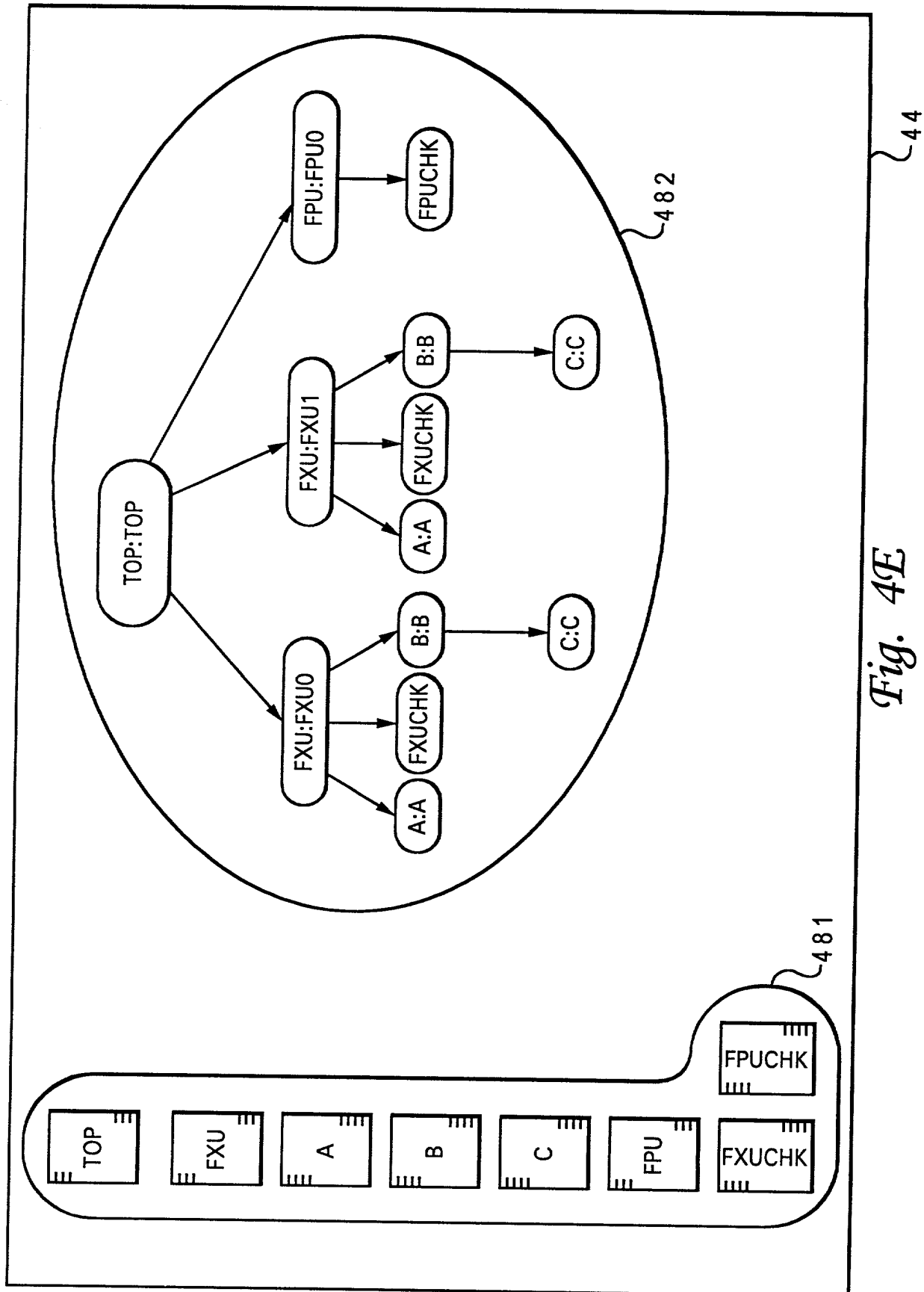


Fig. 4E

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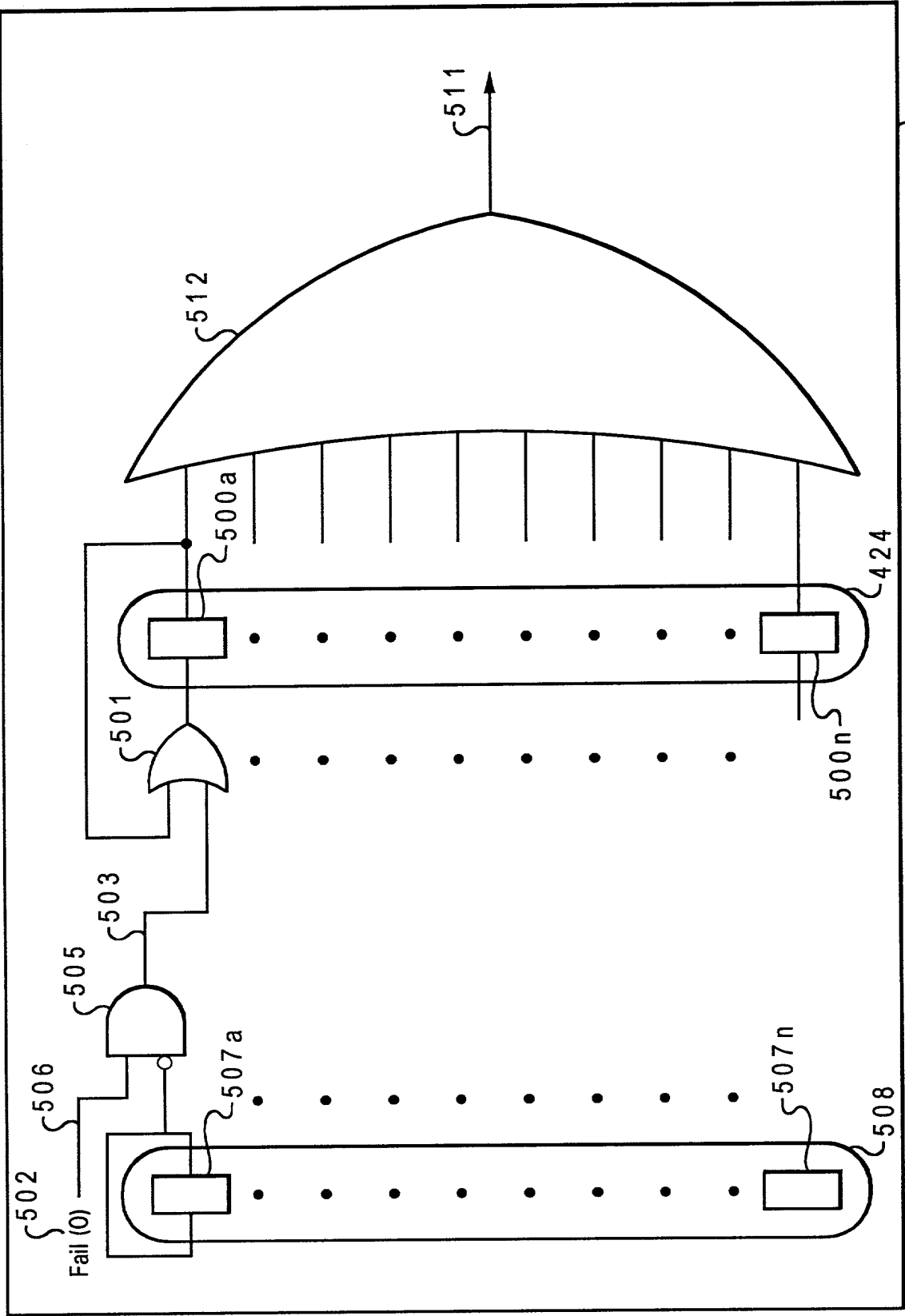


Fig. 5A

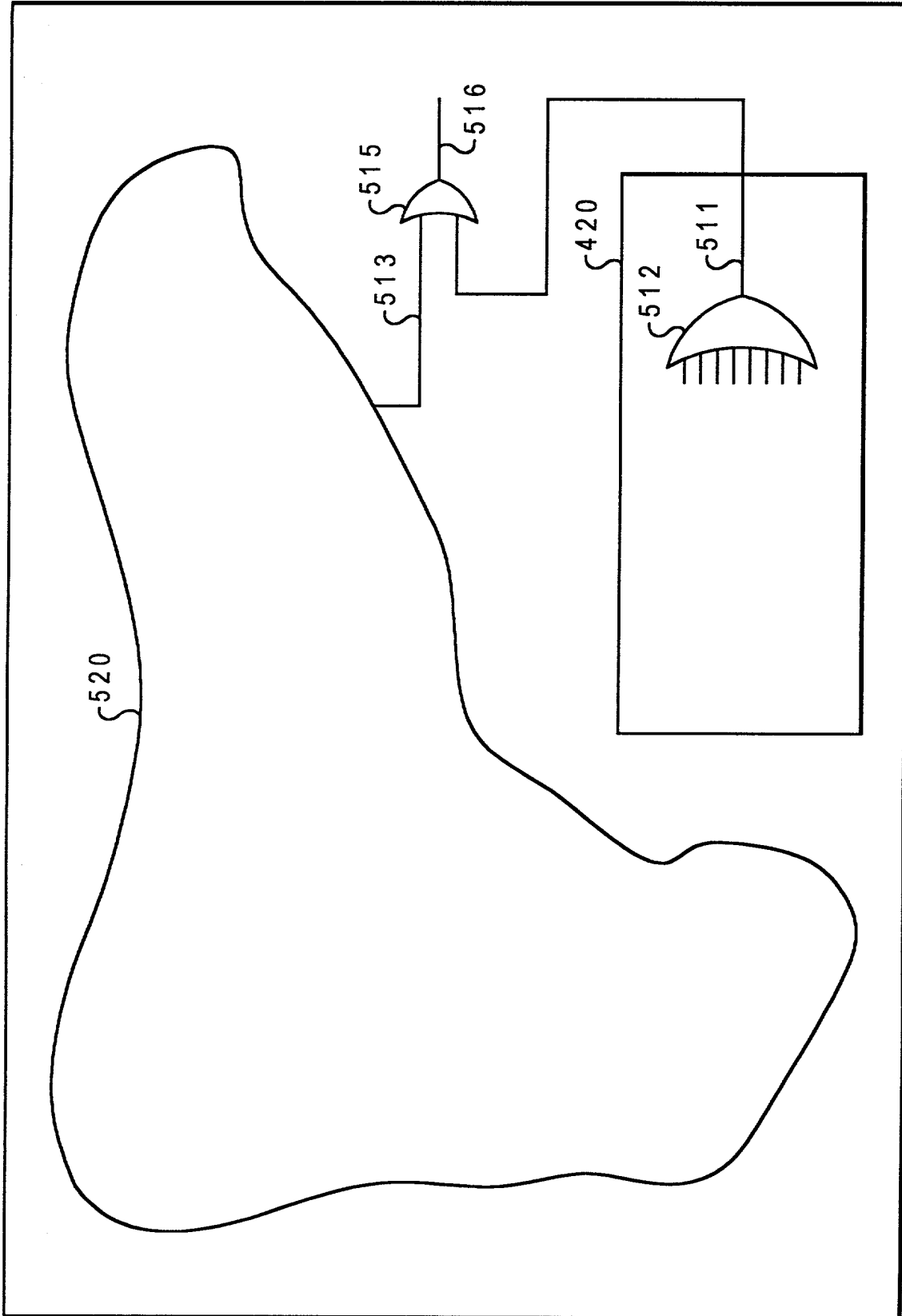


Fig. 5B

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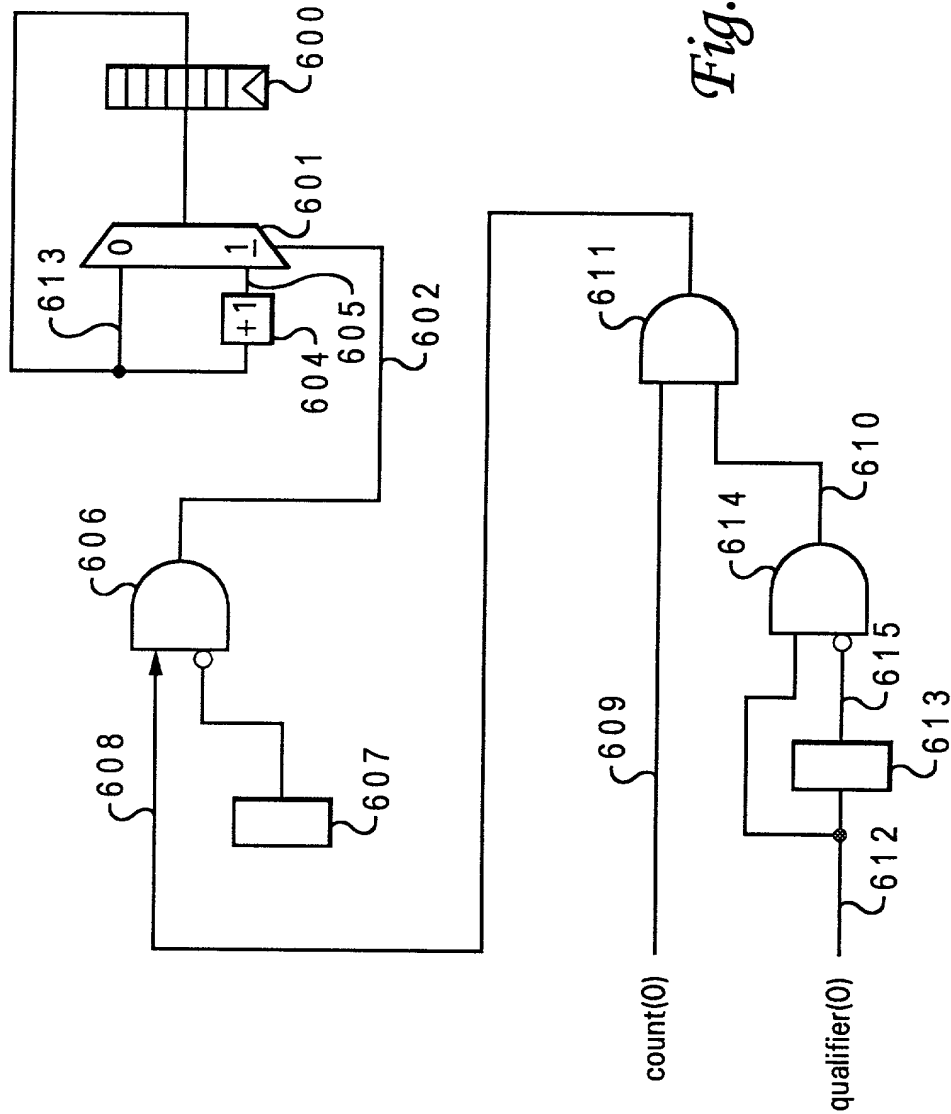


Fig. 6A

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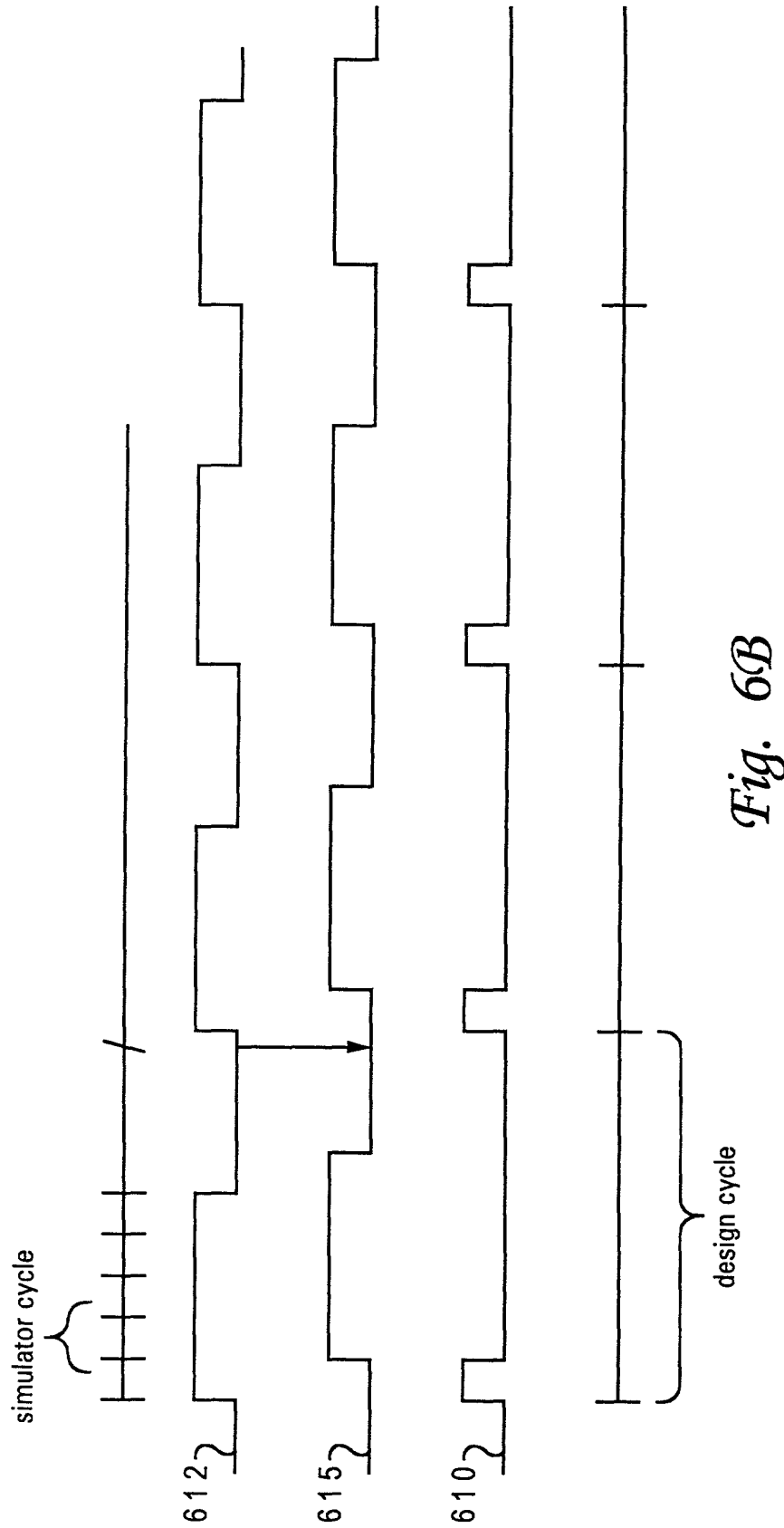


Fig. 6B

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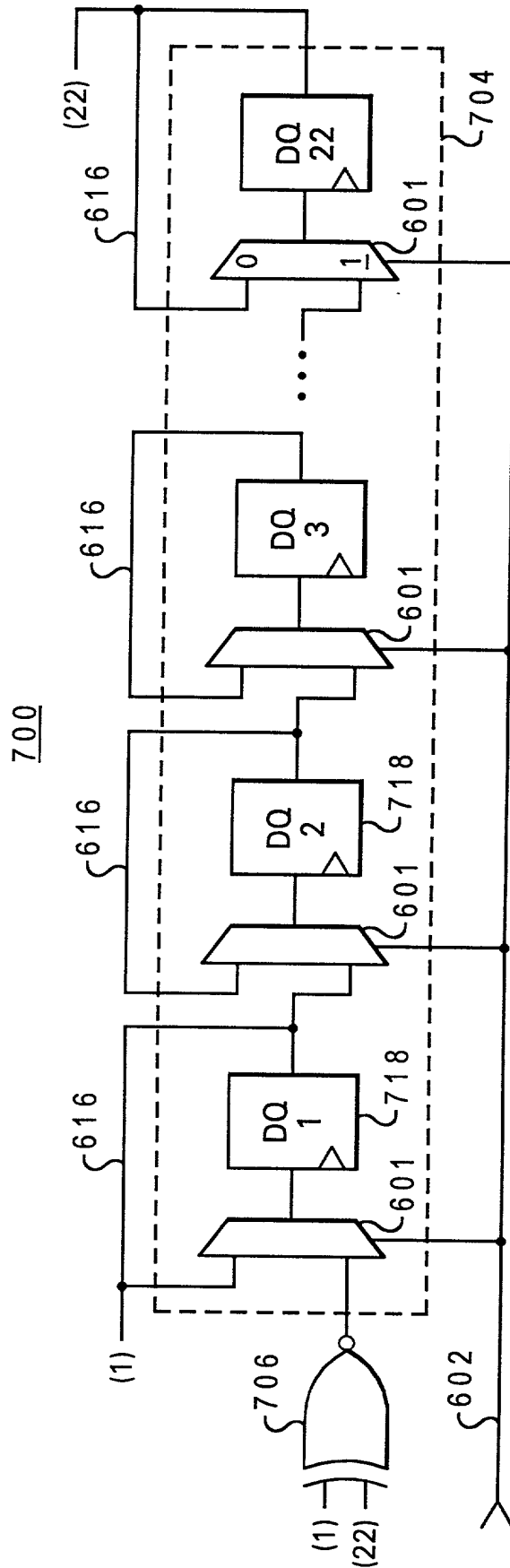


Fig. 7

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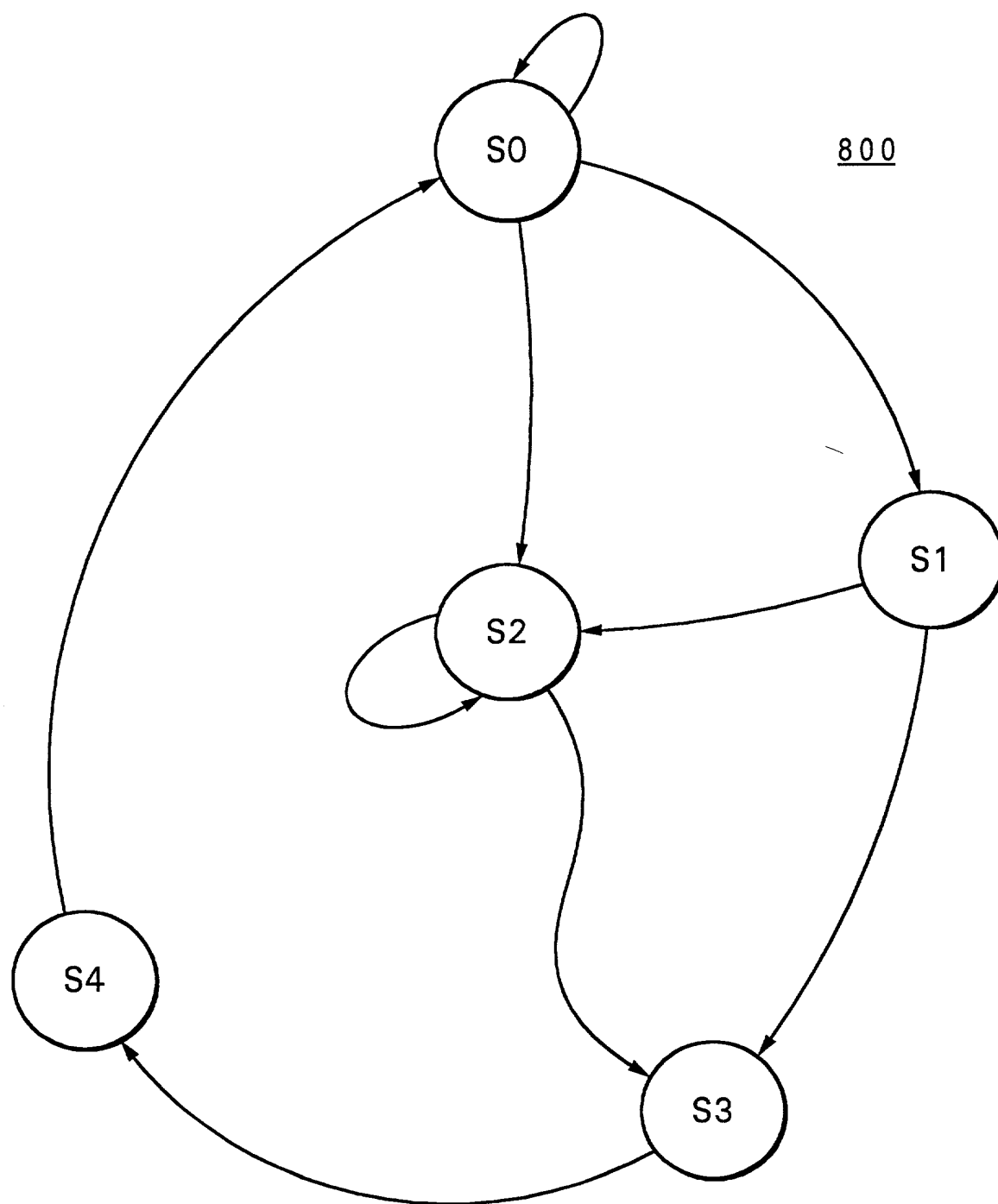


Fig. 8A
Prior Art

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entity FSM : FSM

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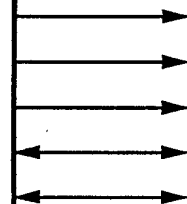
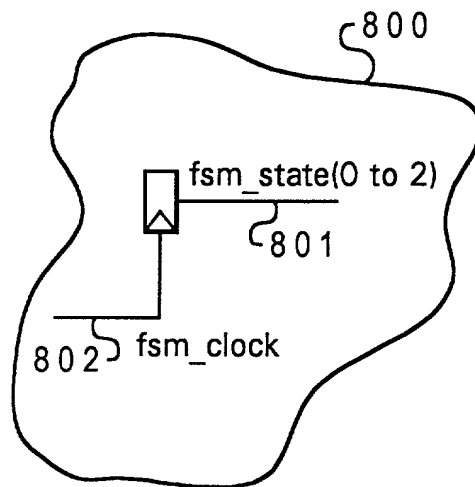
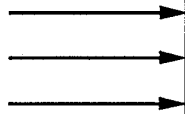


Fig. 8B
Prior Art

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ENTITY FSM IS

PORT(
....ports for entity fsm....
);

ARCHITECTURE FSM OF FSM IS

BEGIN

... HDL code for FSM and rest of the entity ...

fsm_state(0 to 2) <= ... Signal 801 ...

8 5 3	{	--!! Embedded FSM : examplefsm;	}	8 5 2	}	8 6 0
8 5 9	{	--!! clock : (fsm_clock);				
8 5 4	{	--!! state_vector : (fsm_state(0 to 2));				
8 5 5	{	--!! states : (S0, S1, S2, S3, S4);				
8 5 6	{	--!! state_encoding : ('000', '001', '010', '011', '100');				
8 5 7	{	--!! arcs : (S0 => S0, S0 => S1, S0 => S2, --!! (S1 => S2, S1 => S3, S2 => S2, --!! (S2 => S3, S3 => S4, S4 => S0);				
8 5 8	{	--!! End FSM;				

END;

Fig. 8C

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entity FSM : FSM

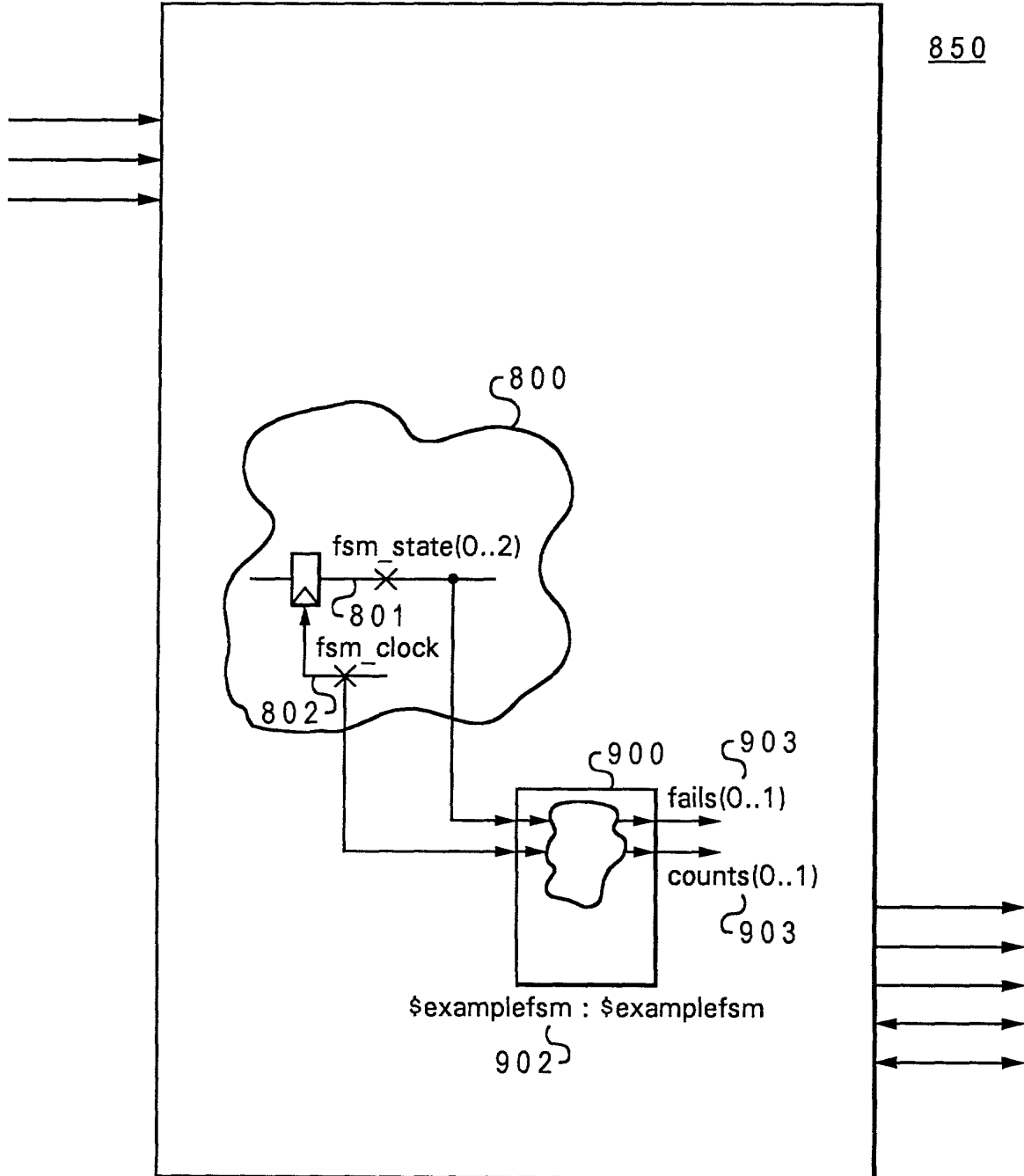
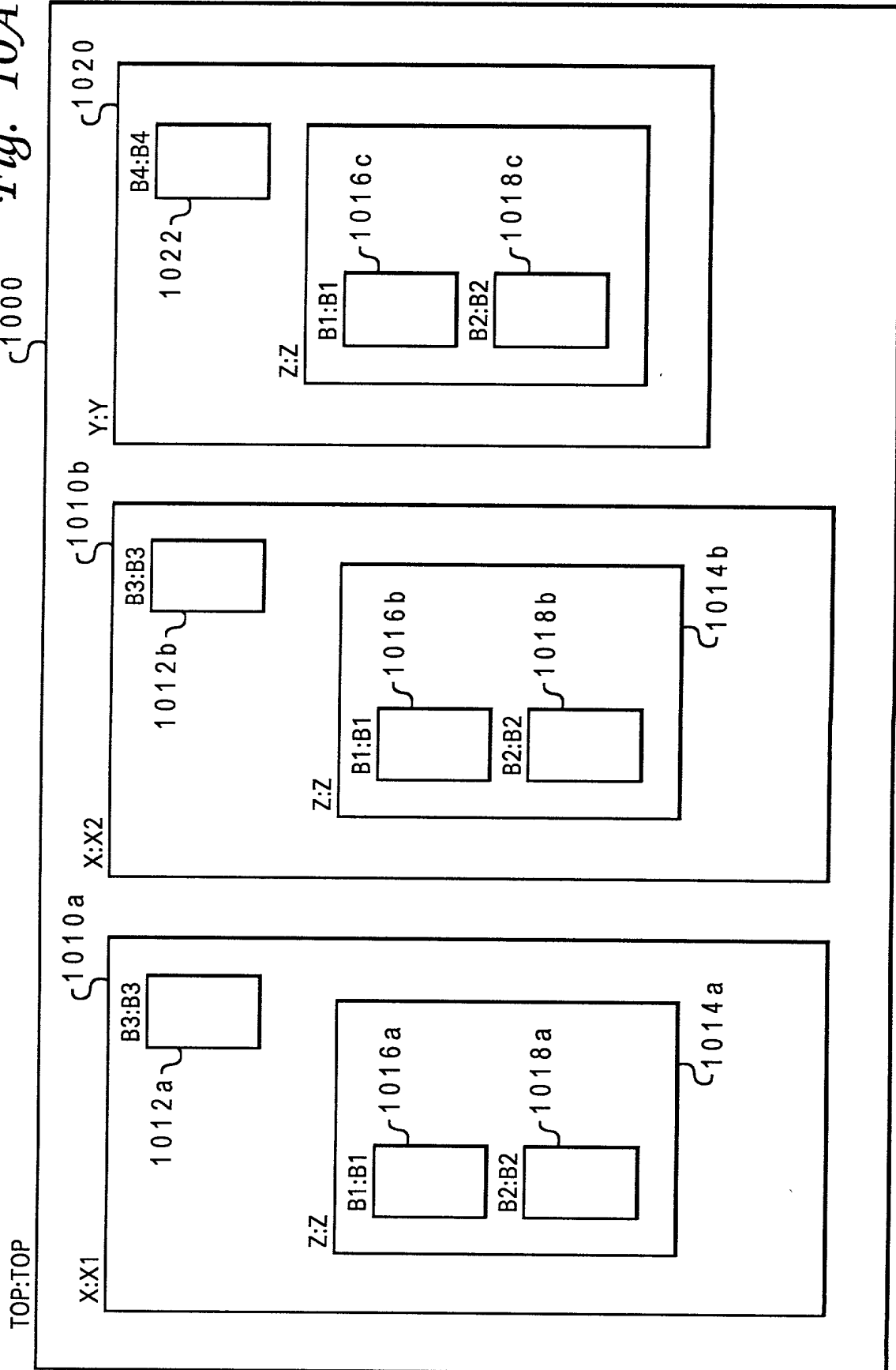


Fig. 9

Fig. 10A



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1030 1032 1034 1036
<instantiation identifier> . <instrumentation entity name> . <design entity name> . <eventname>

Fig. 10B

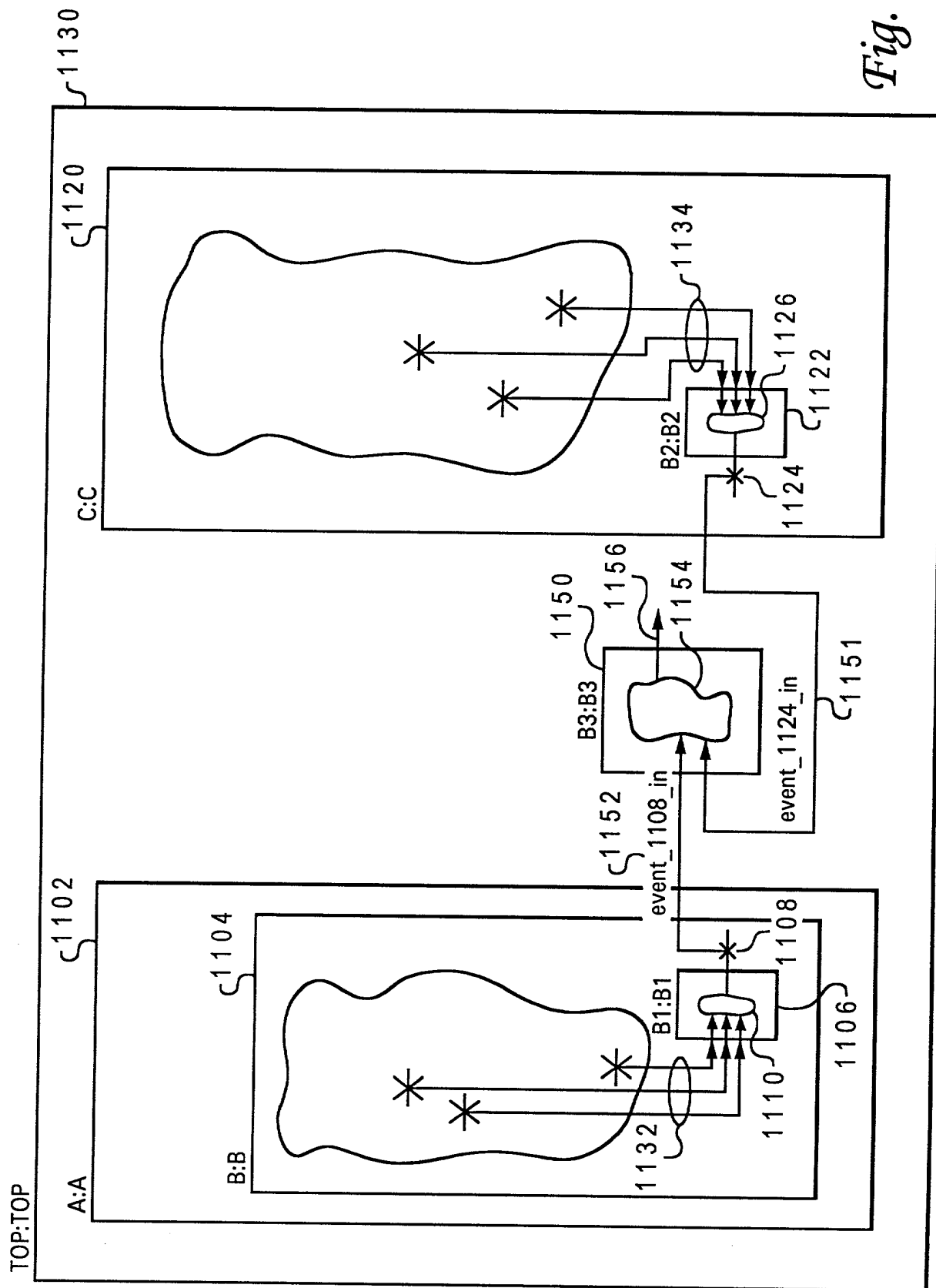
1030	1032	1034	1036
X1	B3	X	COUNT1
X1.Z	B1	Z	COUNT1
X1.Z	B2	Z	COUNT1
X2	B3	X	COUNT1
X2.Z	B1	Z	COUNT1
X2.Z	B2	Z	COUNT1
Y	B4	Y	COUNT1
Y.Z	B1	Z	COUNT1
Y.Z	B2	Z	COUNT1
			1040
			1041
			1042
			1043
			1044
			1045
			1046
			1047
			1048

Fig. 10C

1030 1034 1036
<instantiation identifier> . <design entity name> . <eventname>

Fig. 10D

Fig. 11A



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--!! Inputs
--!! event_1108_in <= C.[B2.count.event_1108];
--!! event_1124_in <= A.B.[B1.count.event_1124];
--!! End Inputs

1163 1165 1161 1162 1164 1166

Fig. 11B

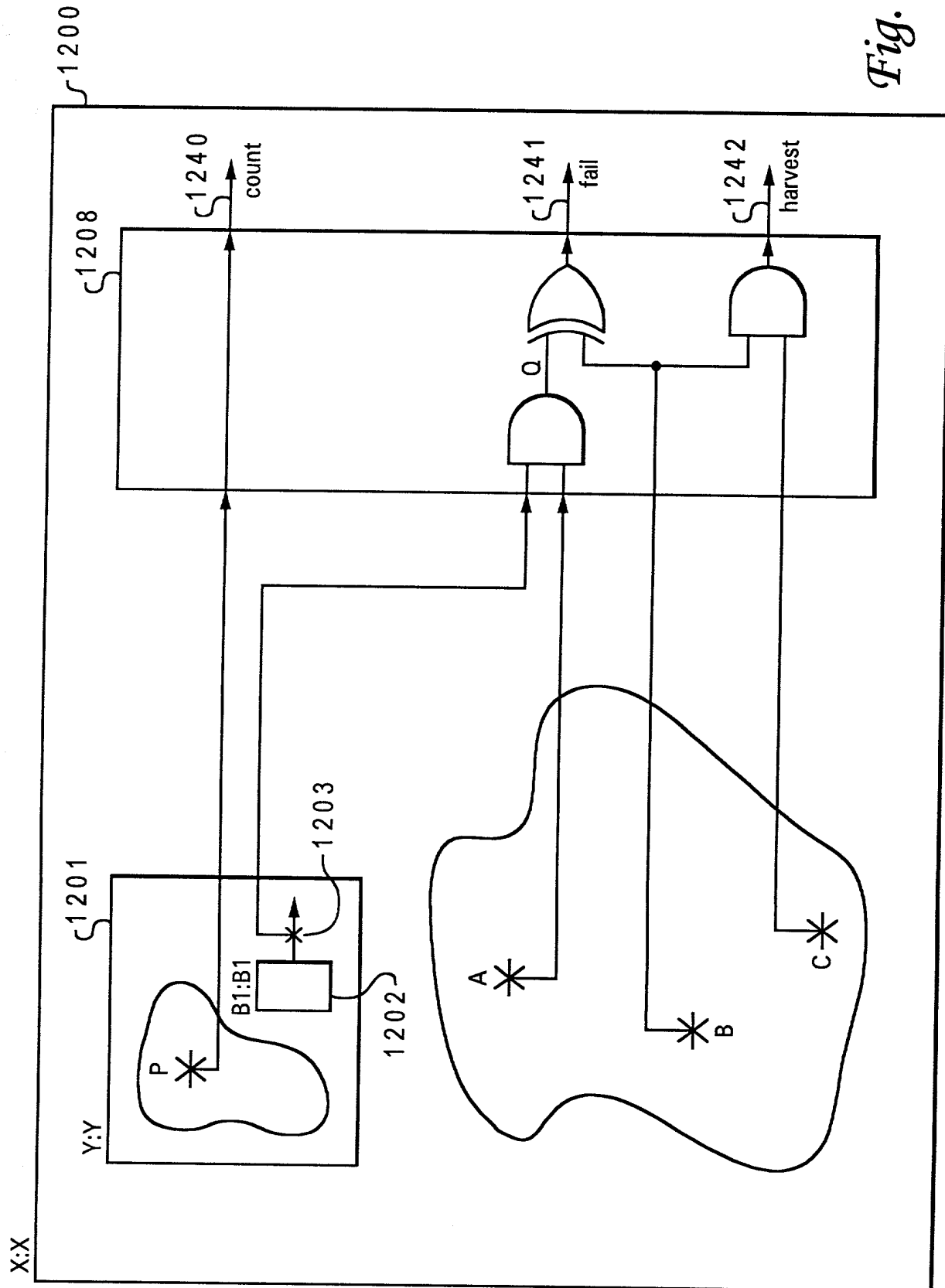
--!! Inputs
--!! event_1108_in <= C.[count.event_1108];
--!! event_1124_in <= B.[count.event_1124];
--!! End Inputs

1171 1172

Fig. 11C

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Fig. 12A



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ENTITY X IS

PORT(:
:
:
);

ARCHITECTURE example of X IS

BEGIN

.
.
.
.
... HDL code for X ...
.
.
.

1 2 2 1 { Y:Y
PORT MAP(:
:
);

1 2 2 2 { A <=
B <=
C <=

1 2 2 3 { --!! [count, countname0, clock] <= Y.P; 1 2 3 0
--!! Q <= Y. [B1.count.count1] AND A; 1 2 3 2
--!! [fail, failname0, "fail msg"] <= Q XOR B; 1 2 3 4
--!! [harvest, harvestname0, "harvest msg"] <= B AND C;
END; 1 2 3 6

1 2 2 0

Fig. 12B

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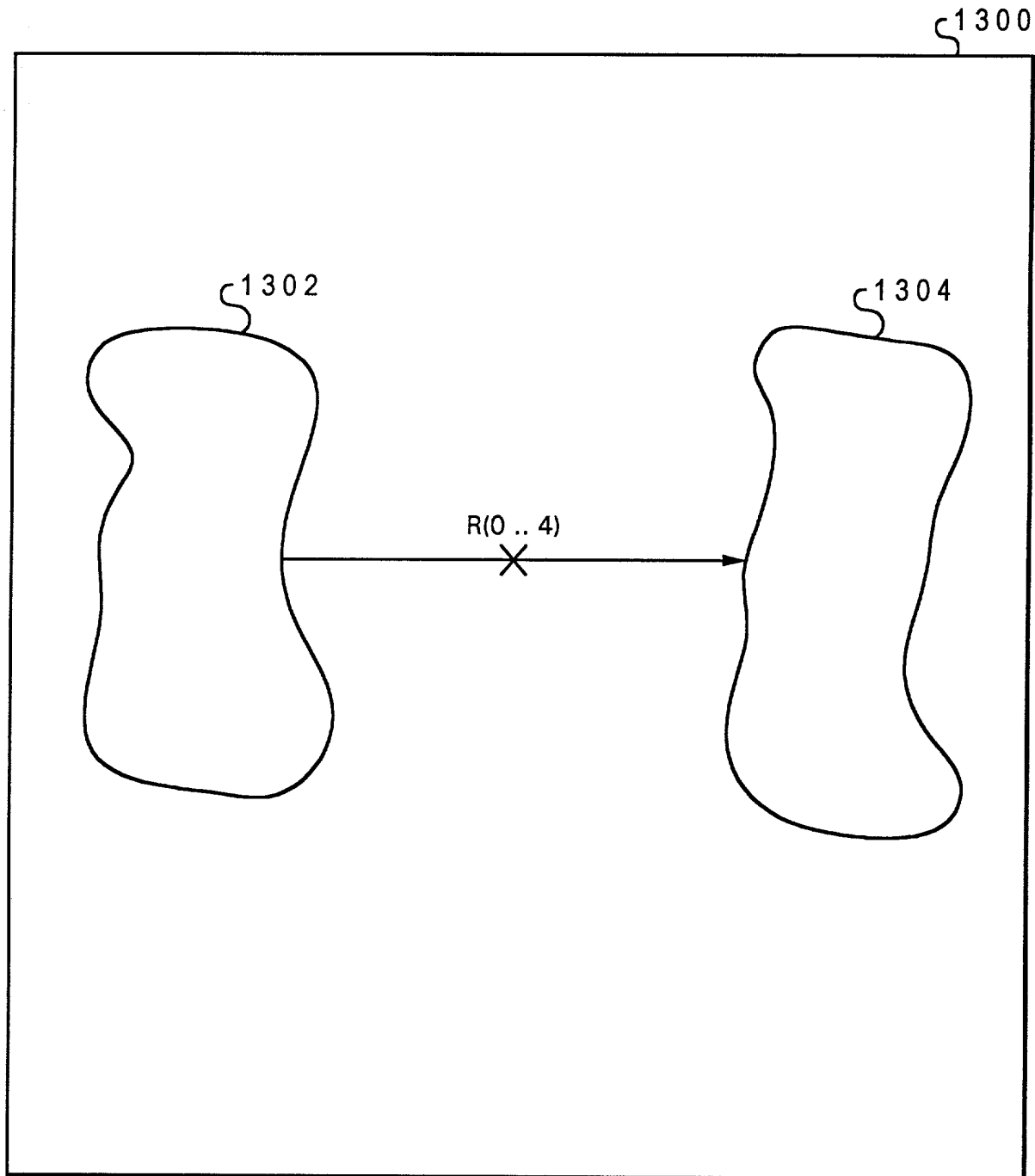


Fig. 13A

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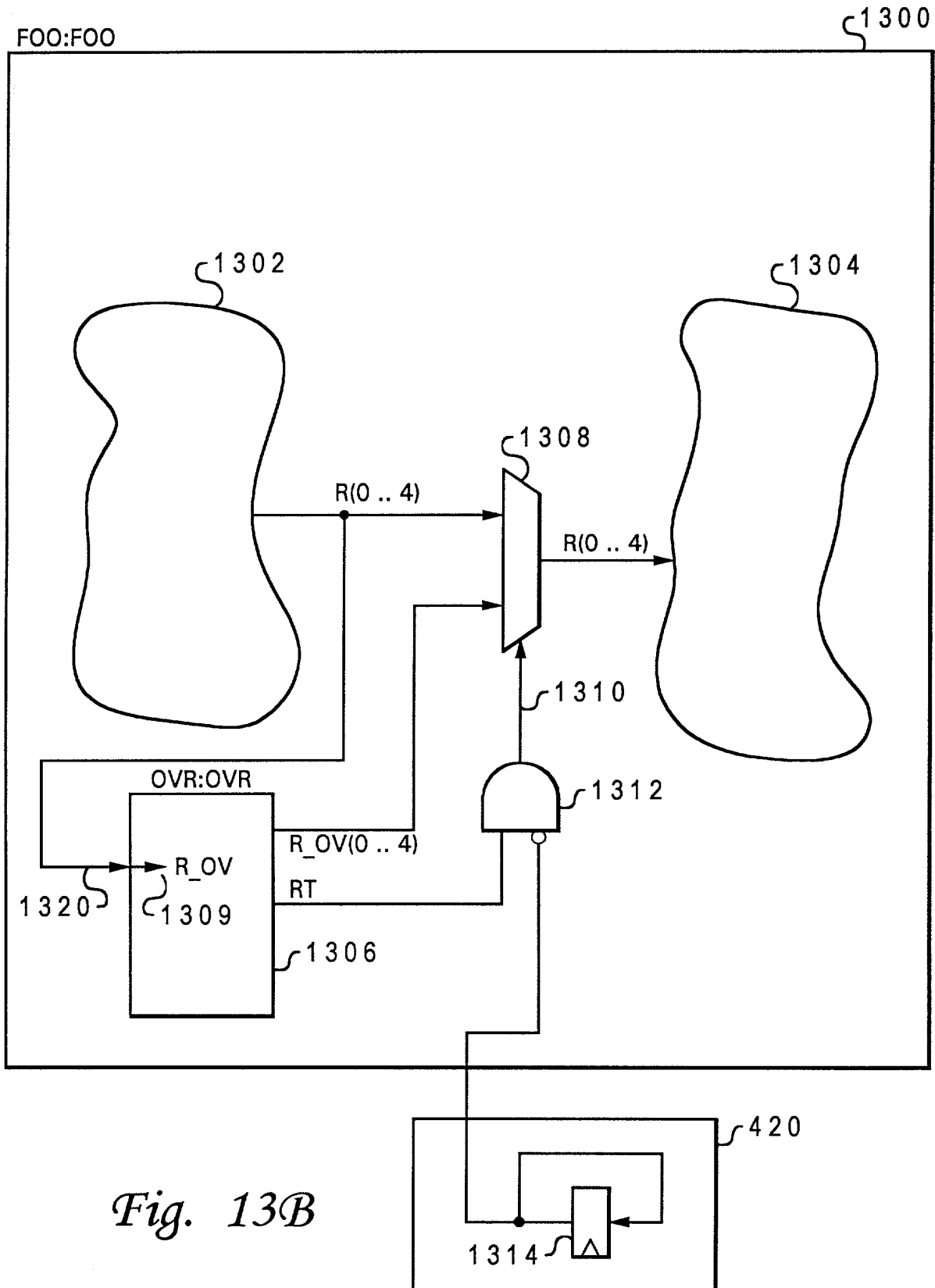


Fig. 13B

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```

ENTITY OVR IS
    PORT(  R_IN      :  IN std_ulogic_vector(0 .. 4);
          .
          .
          ... other ports as required ...
          .
          .
          R_OV      :  OUT std_ulogic_vector(0 .. 4);
          RT        :  OUT std_ulogic
    );

--!! BEGIN
--!! Design Entity: FOO;

--!! Inputs (0 to 4)
--!! R_IN => {R(0 .. 4)};
--!! :
... other ports as needed ...
--!! :
--!! End Inputs

--!! Outputs
--!! <R_OVRIDE> : R_OV(0 .. 4) => R(0 .. 4) [RT];
--!! End Outputs

--!! End

ARCHITECTURE example of OVR IS
BEGIN
    ... HDL code for entity body section ...
END;

```

1364

1362

1363

1360

1361

1356

1351

1340

1358

Fig. 13C

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ENTITY FOO IS

PORT(:
 :
 :
);

ARCHITECTURE example of FOO IS

BEGIN

.
.
.
.
.
R <=
.
.
.
.

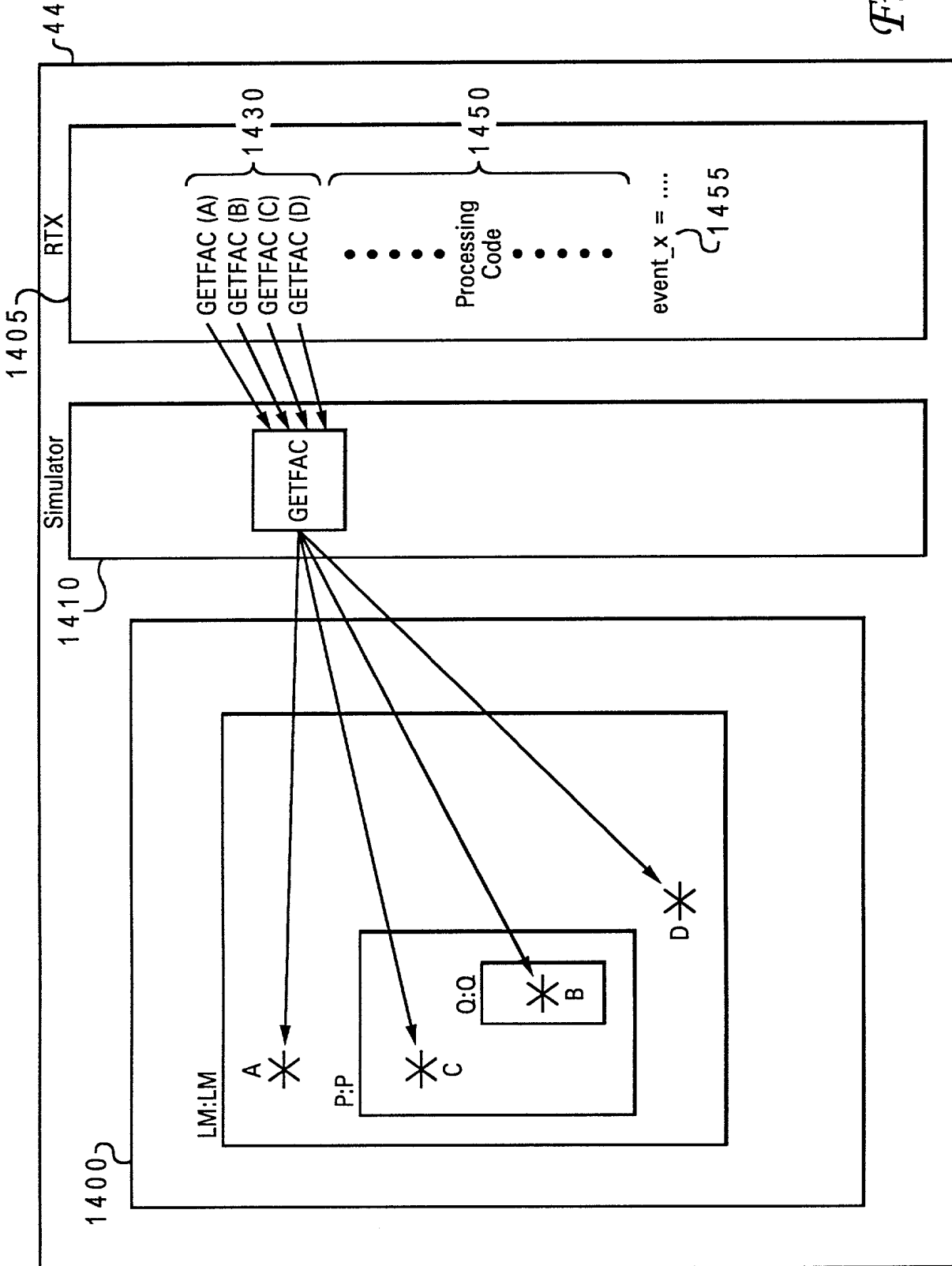
1380 {
 --!! R_IN <= {R};
 --!!
 --!!
 --!! R_OV(0 to 4) <=;
 --!! RT <=;
 --!! [override, R_OVRRIDE, R(0 .. 4), RT] <= R_OV(0 to 4);
}

1381
1382
1383
1384

Fig. 13D

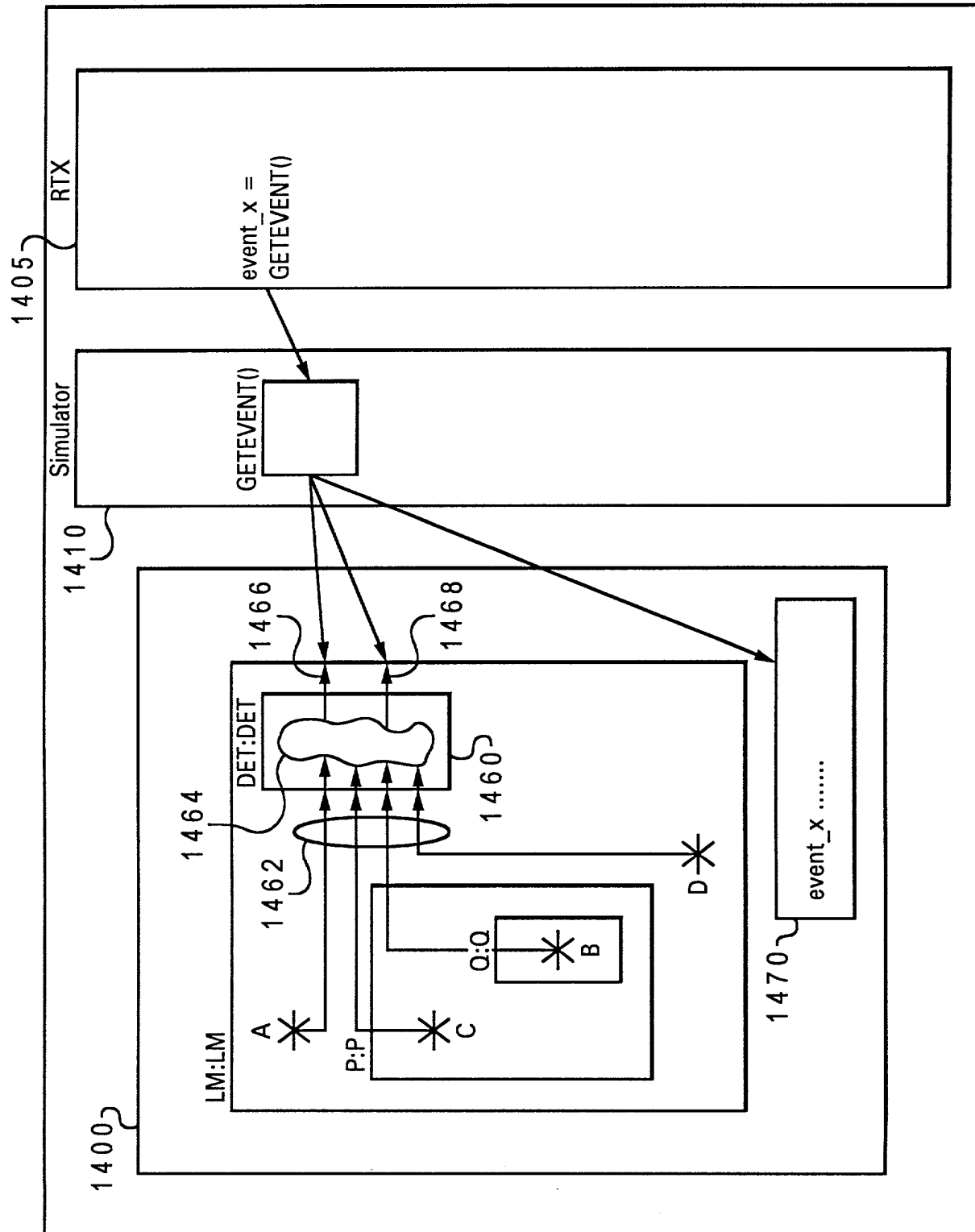
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Fig. 14A



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Fig. 14B



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```

ENTITY DET IS
    PORT(
        A      : IN std_ulogic;
        B      : IN std_ulogic_vector(0 to 5);
        C      : IN std_ulogic;
        D      : IN std_ulogic;
        :      :
        event_x : OUT std_ulogic_vector(0 to 2);
        x_here  : OUT std_ulogic;
    );

    --!! BEGIN
    --!! Design Entity: LM;

    --!! Inputs
    --!! A  => A;
    --!! B  => P.Q.B;
    --!! C  => P.C;
    --!! D  => D;
    --!! End Inputs

    --!! Detections
    --!! <event_x>:event_x(0 to 2) [x_here];
    --!! End Detections

    --!! End;

    ARCHITECTURE example of DET IS
    BEGIN
        ... HDL code ...

    END;

```

1491 {

1493 {

1495 {

1494 {

1480 {

1492 {

Fig. 14C

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1660

1661

1662

1663

1:

X1

B3

X

COUNT1

2:

X1.Z

B1

Z

COUNT1

3:

X1.Z

B2

Z

COUNT1

4:

X2

B3

X

COUNT1

5:

X2.Z

B1

Z

COUNT1

6:

X2.Z

B2

Z

COUNT1

7:

Y

B4

Y

COUNT1

8:

Y.Z

B1

Z

COUNT1

9:

Y.Z

B2

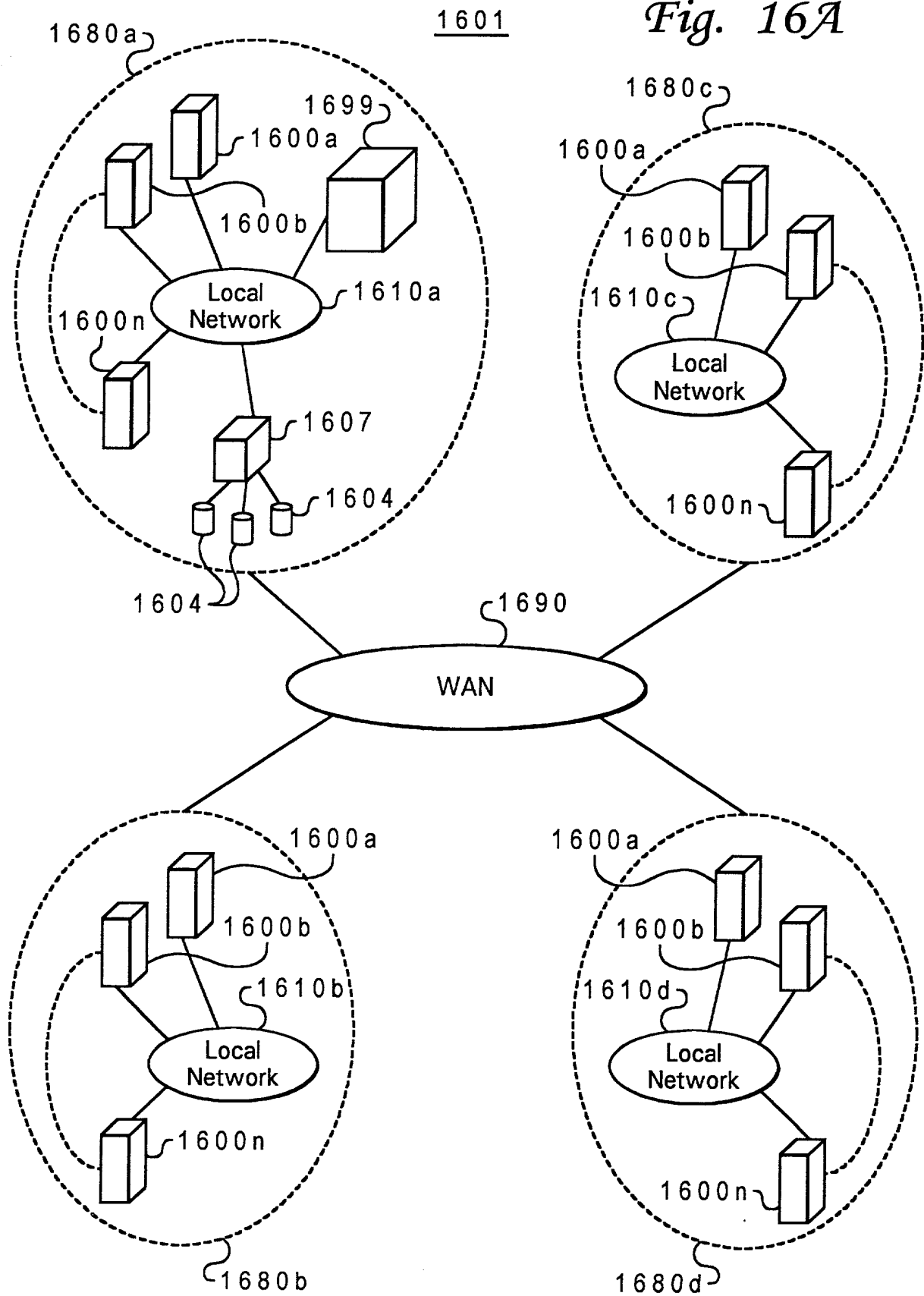
Z

COUNT1

Fig. 15

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Fig. 16A



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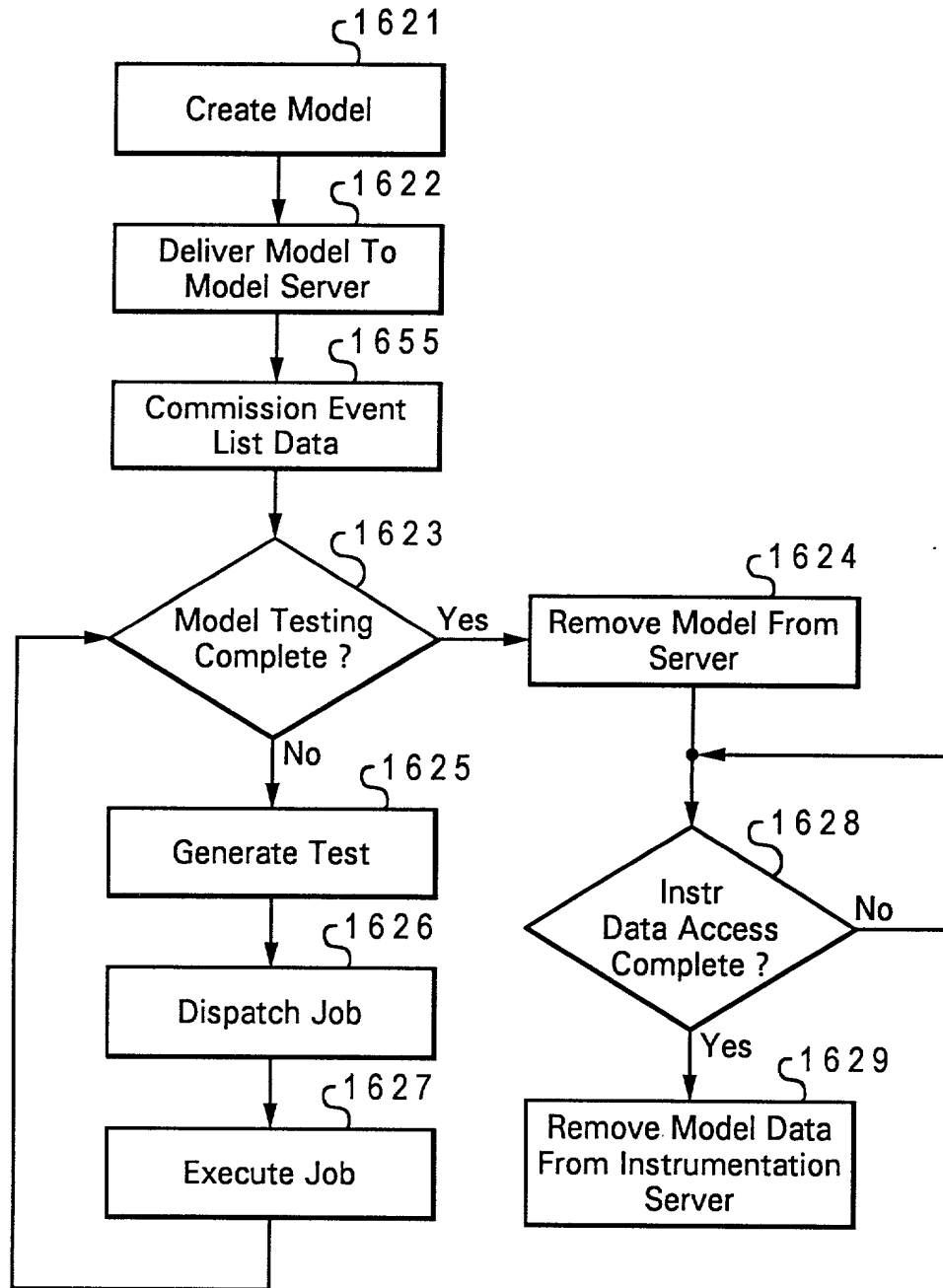


Fig. 16B

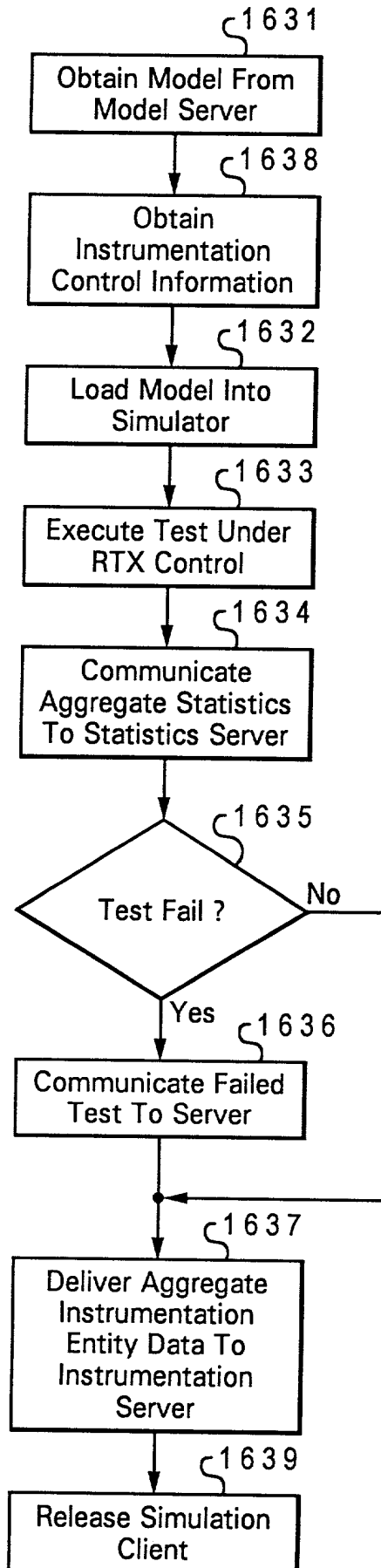


Fig. 16C

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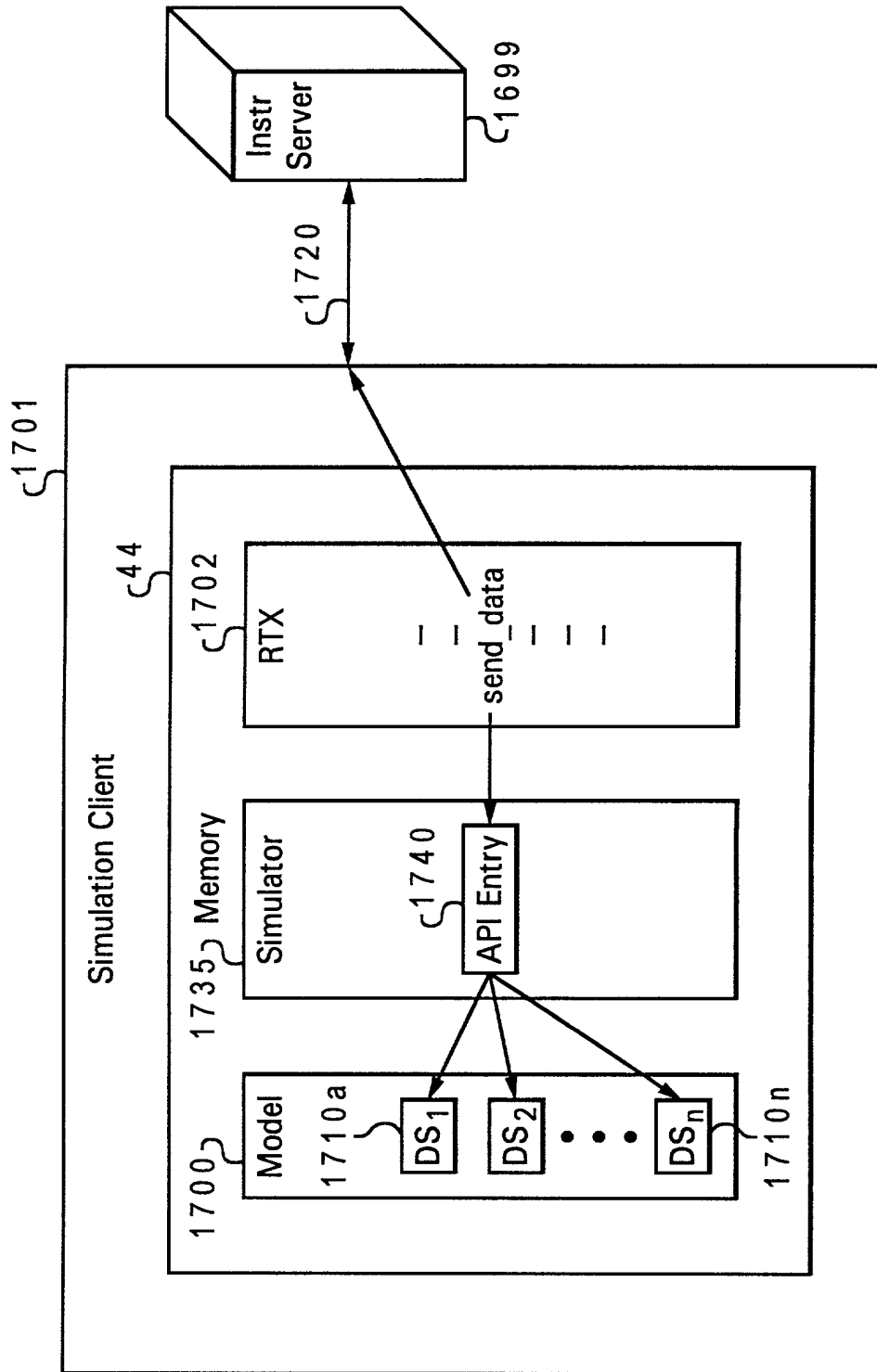


Fig. 17A

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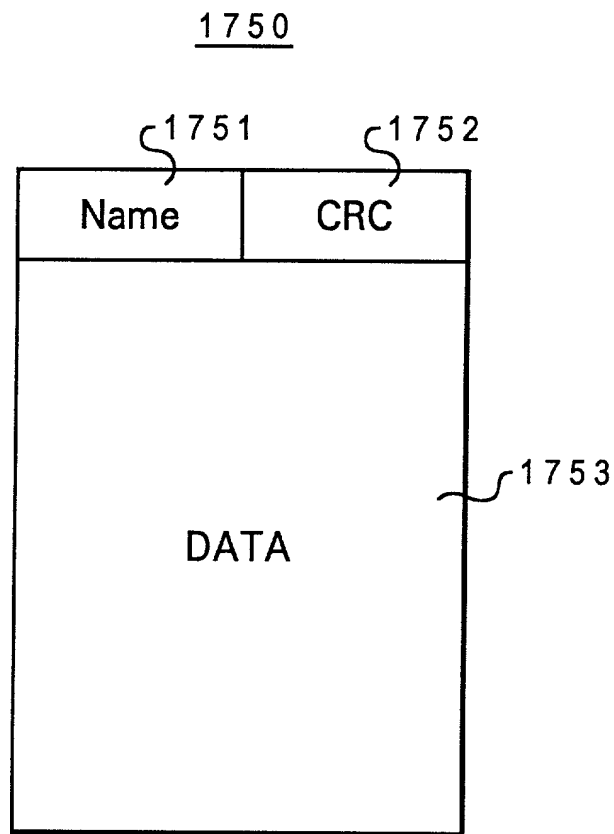


Fig. 17B

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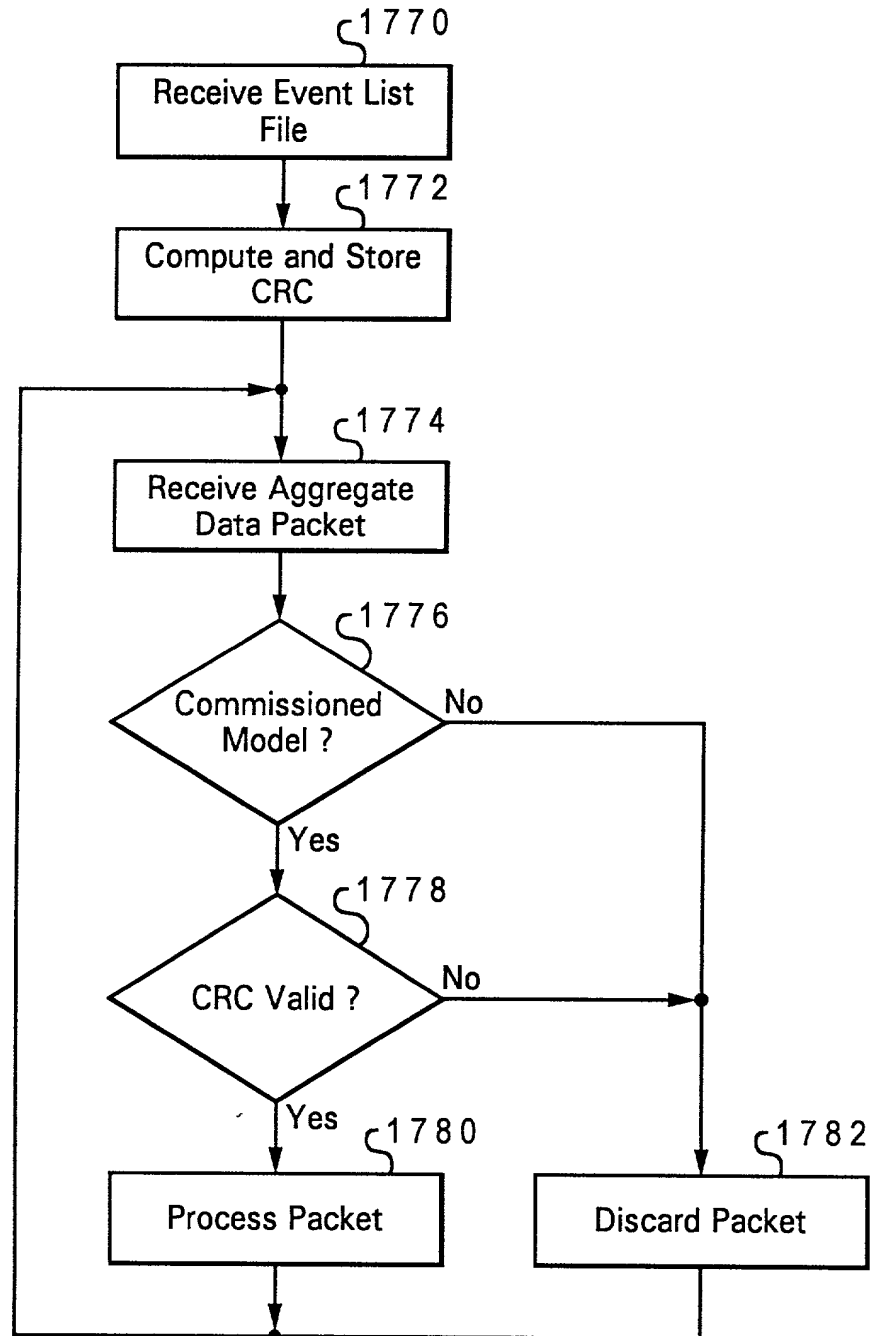


Fig. 17C

2025-02-20 10:20:00

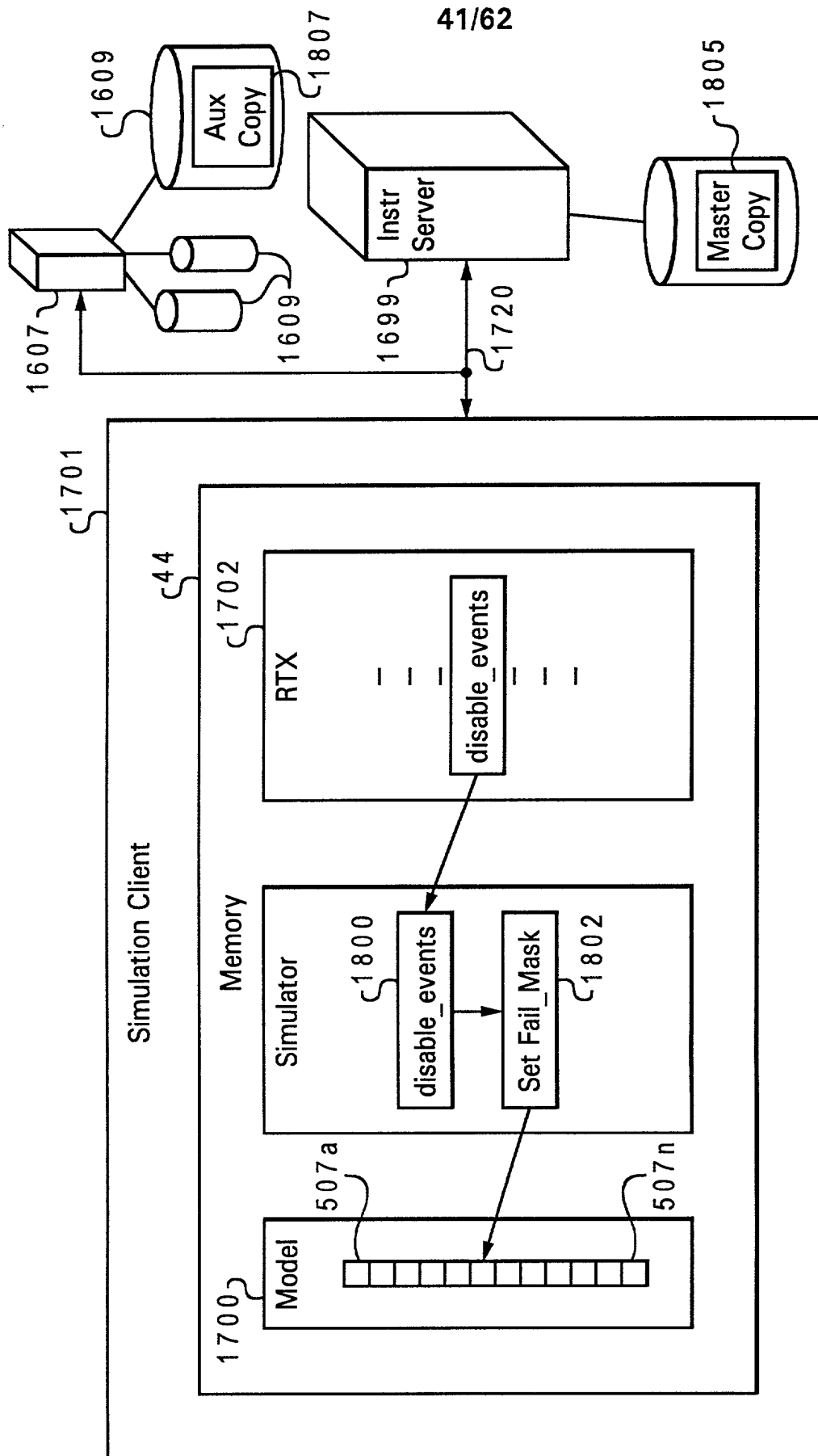
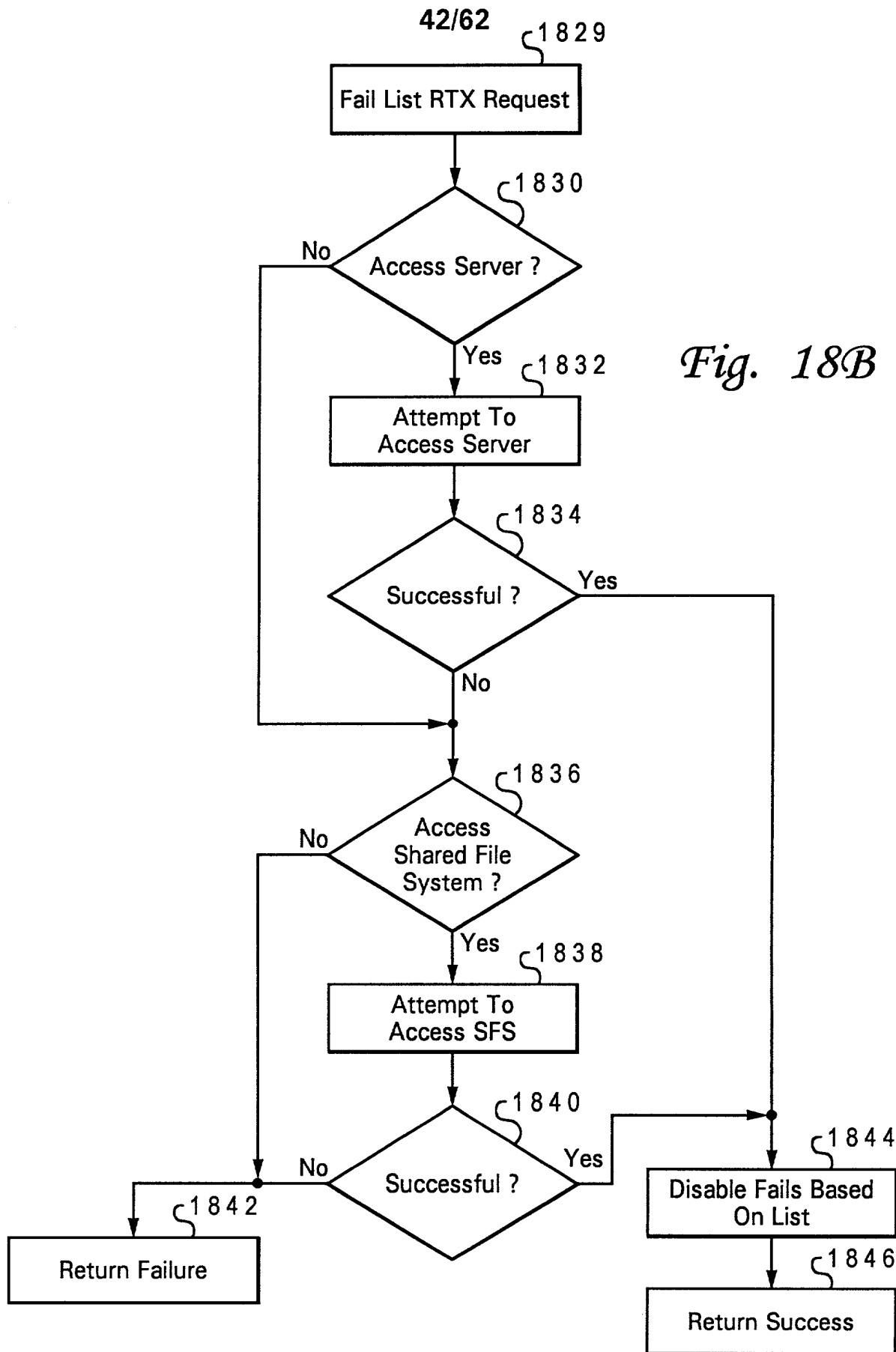
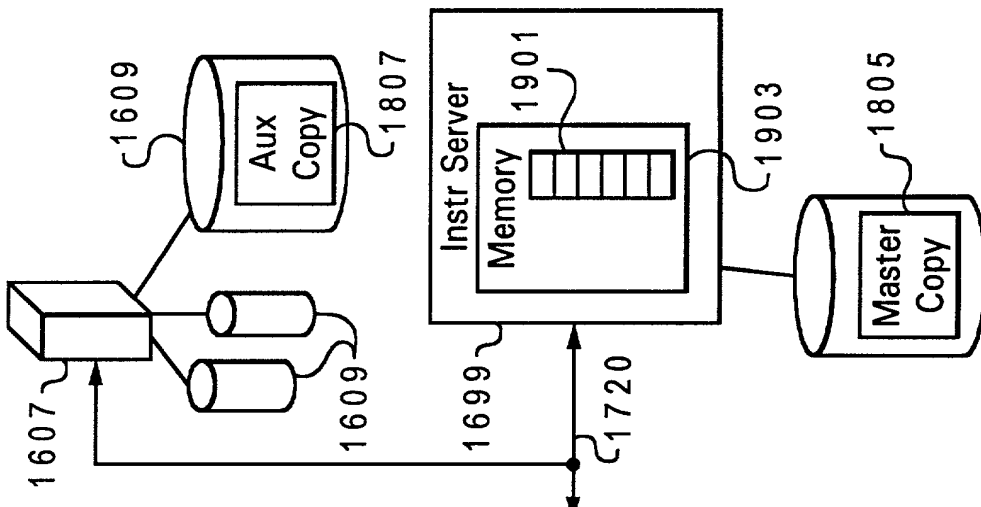


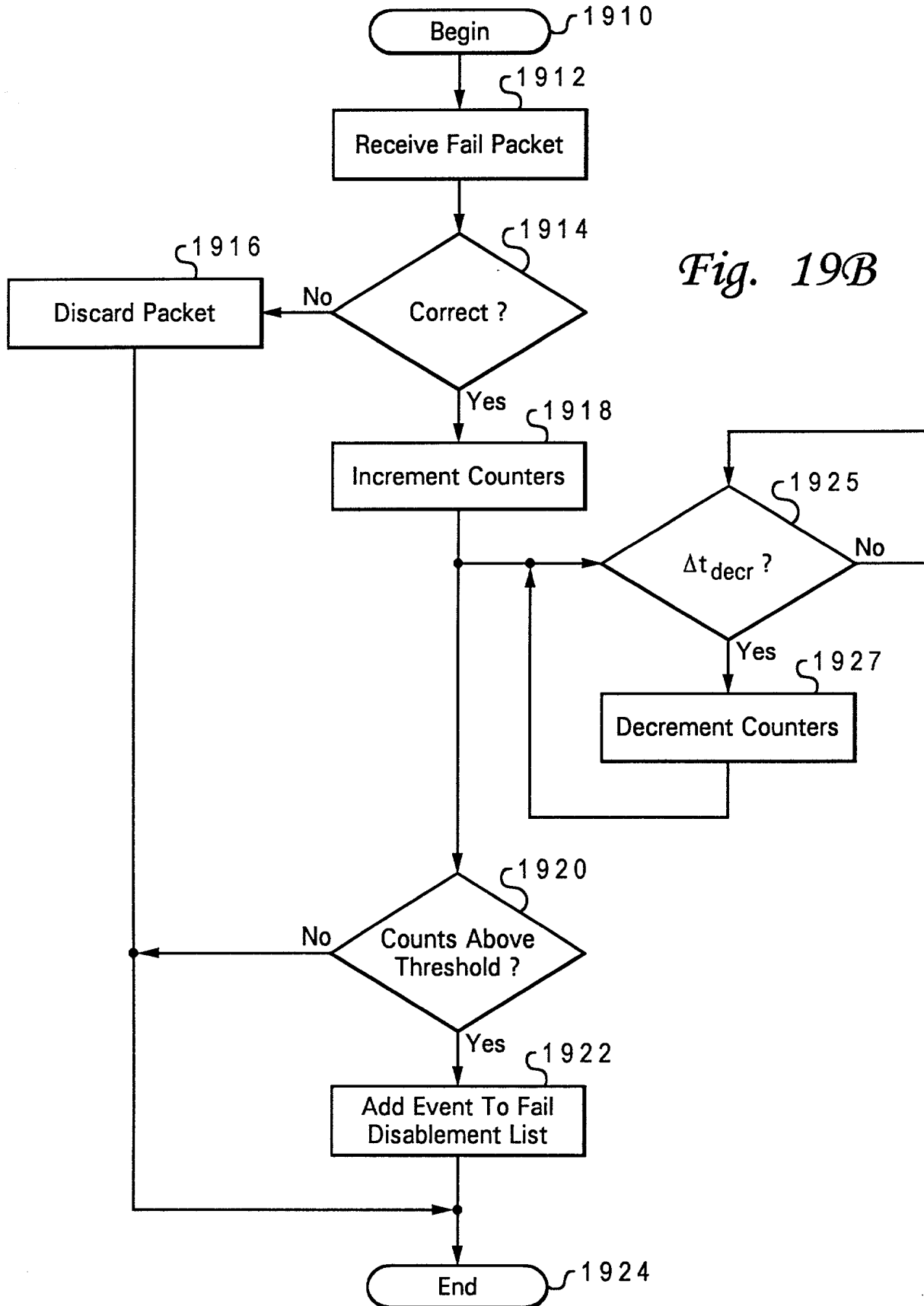
Fig. 18A

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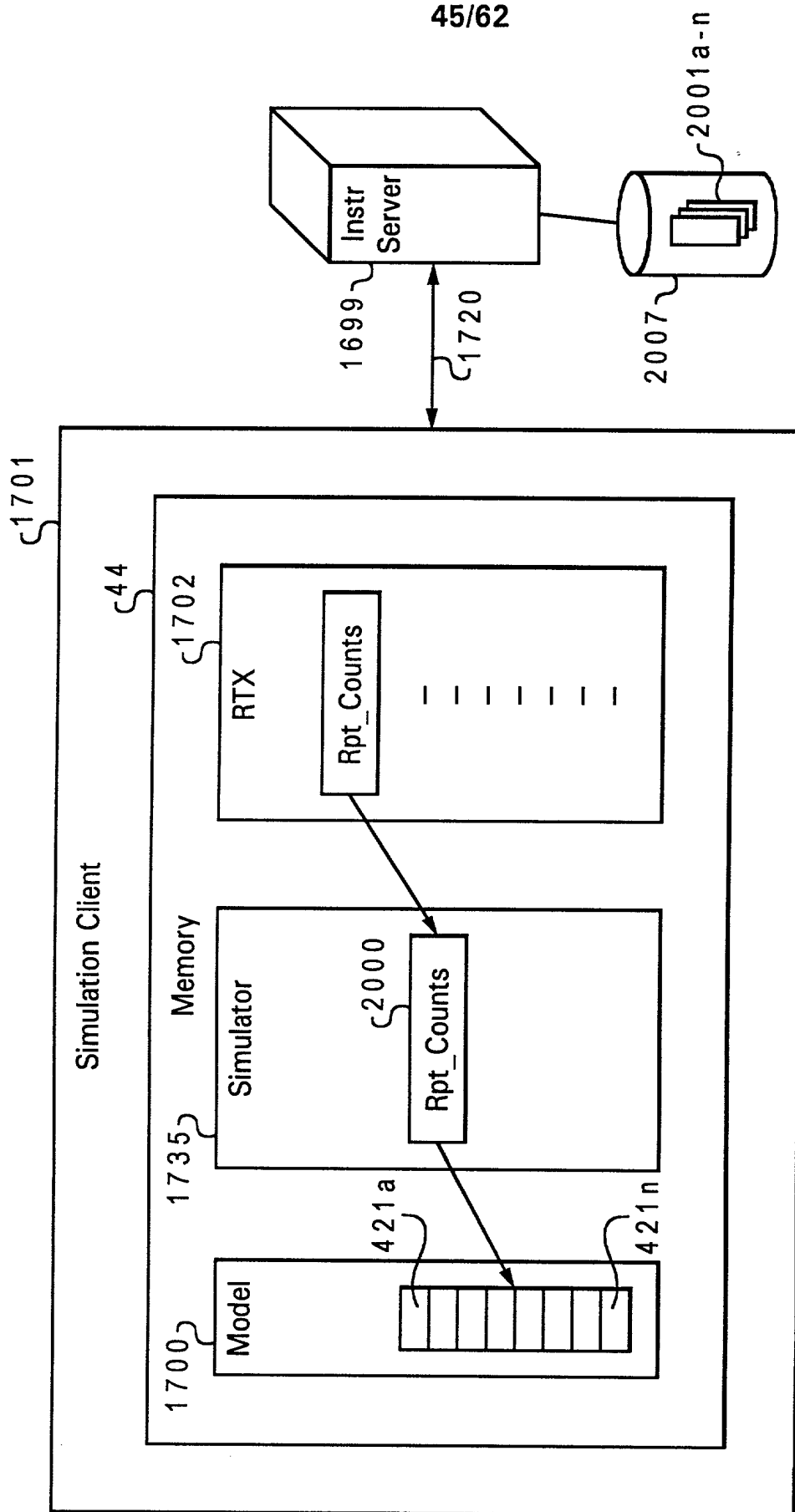


Fig. 20A

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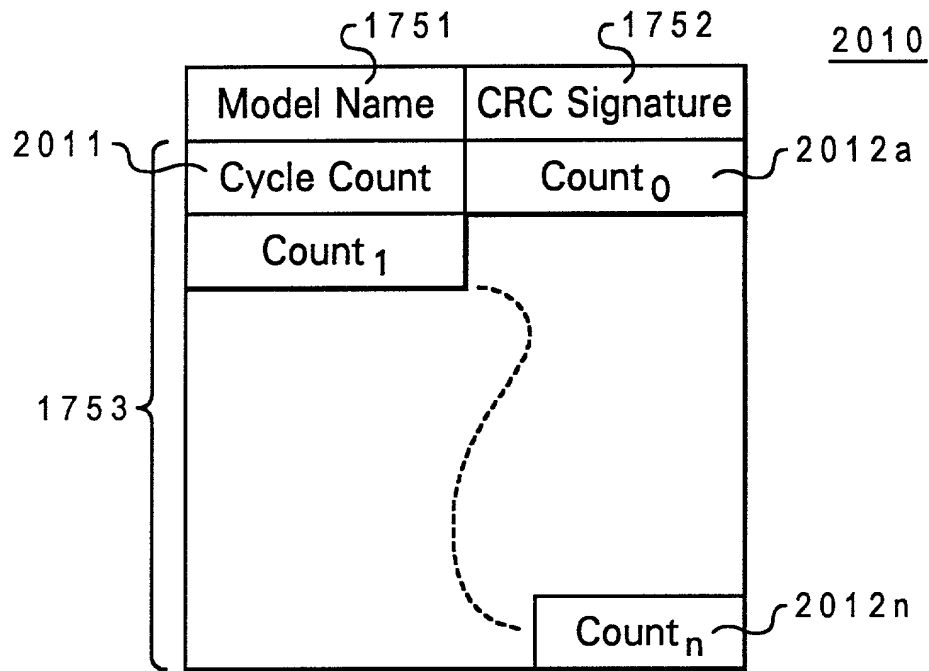


Fig. 20B

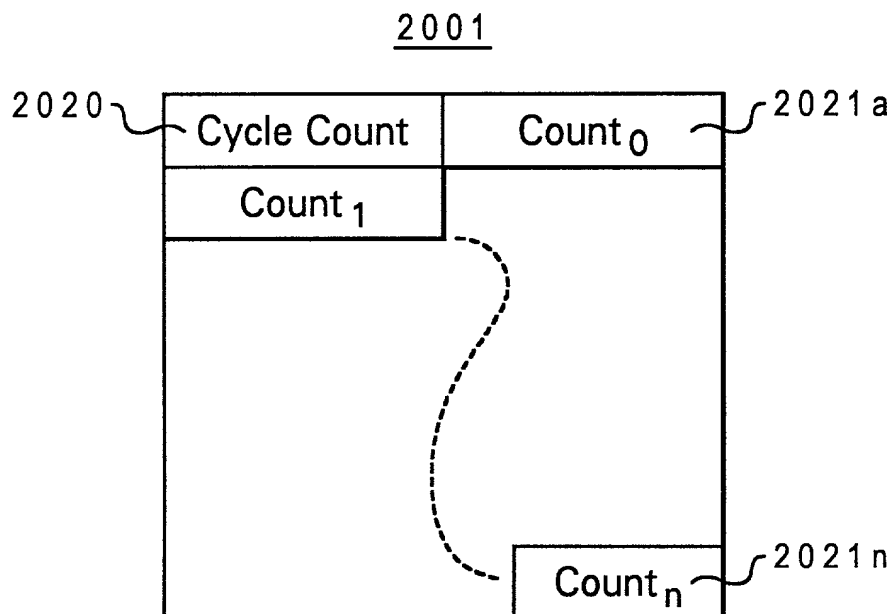


Fig. 20C

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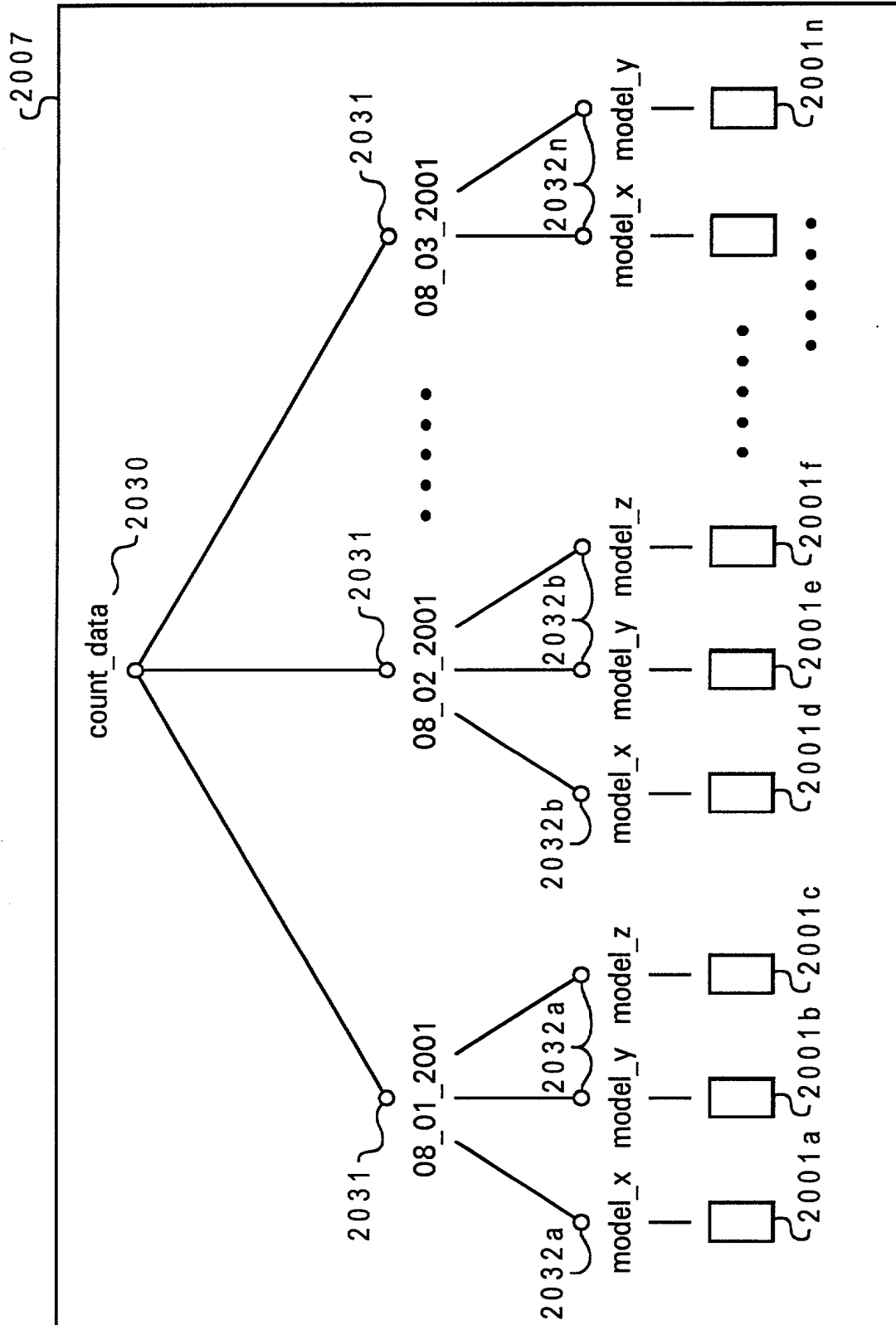


Fig. 20D

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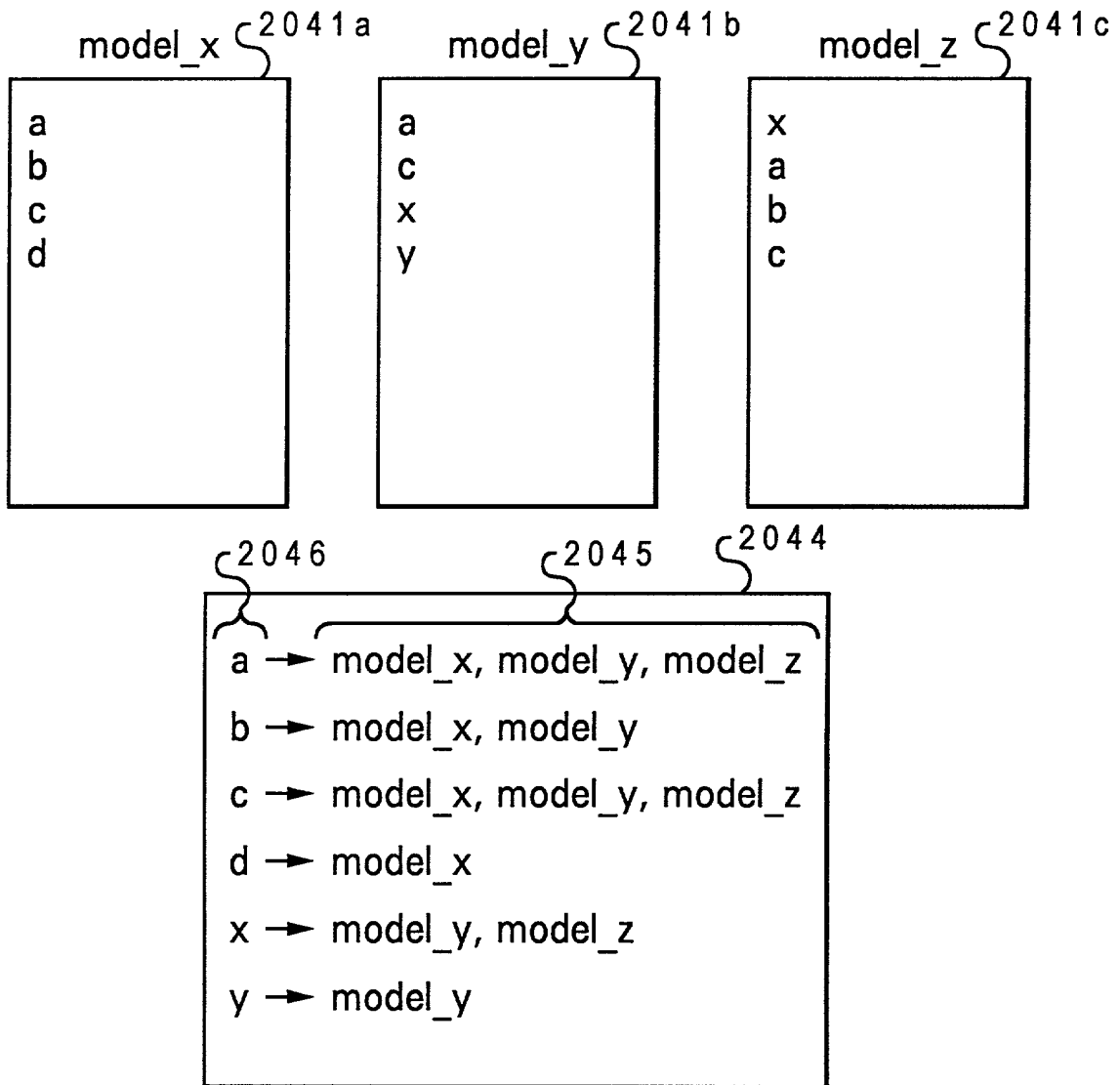
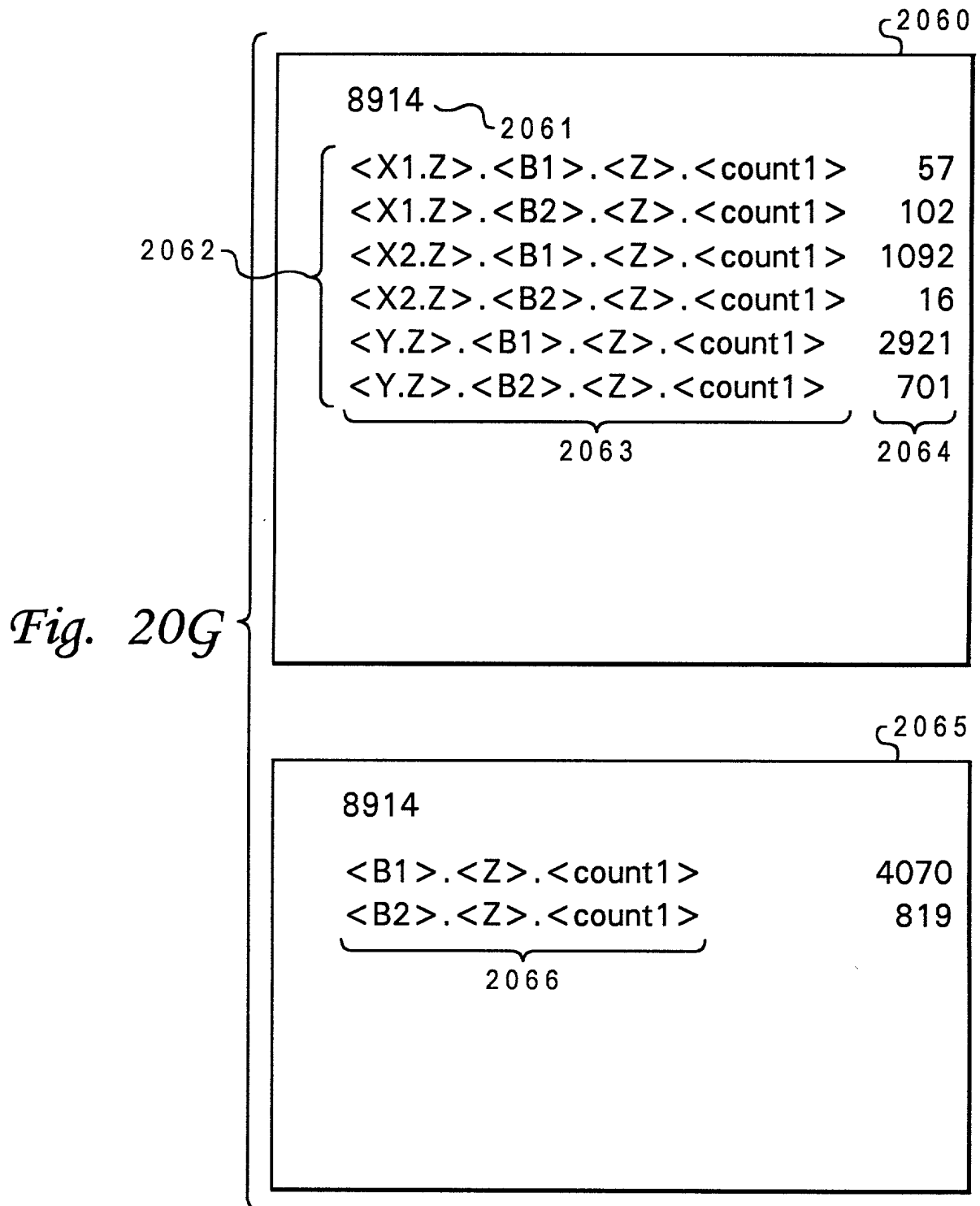


Fig. 20E

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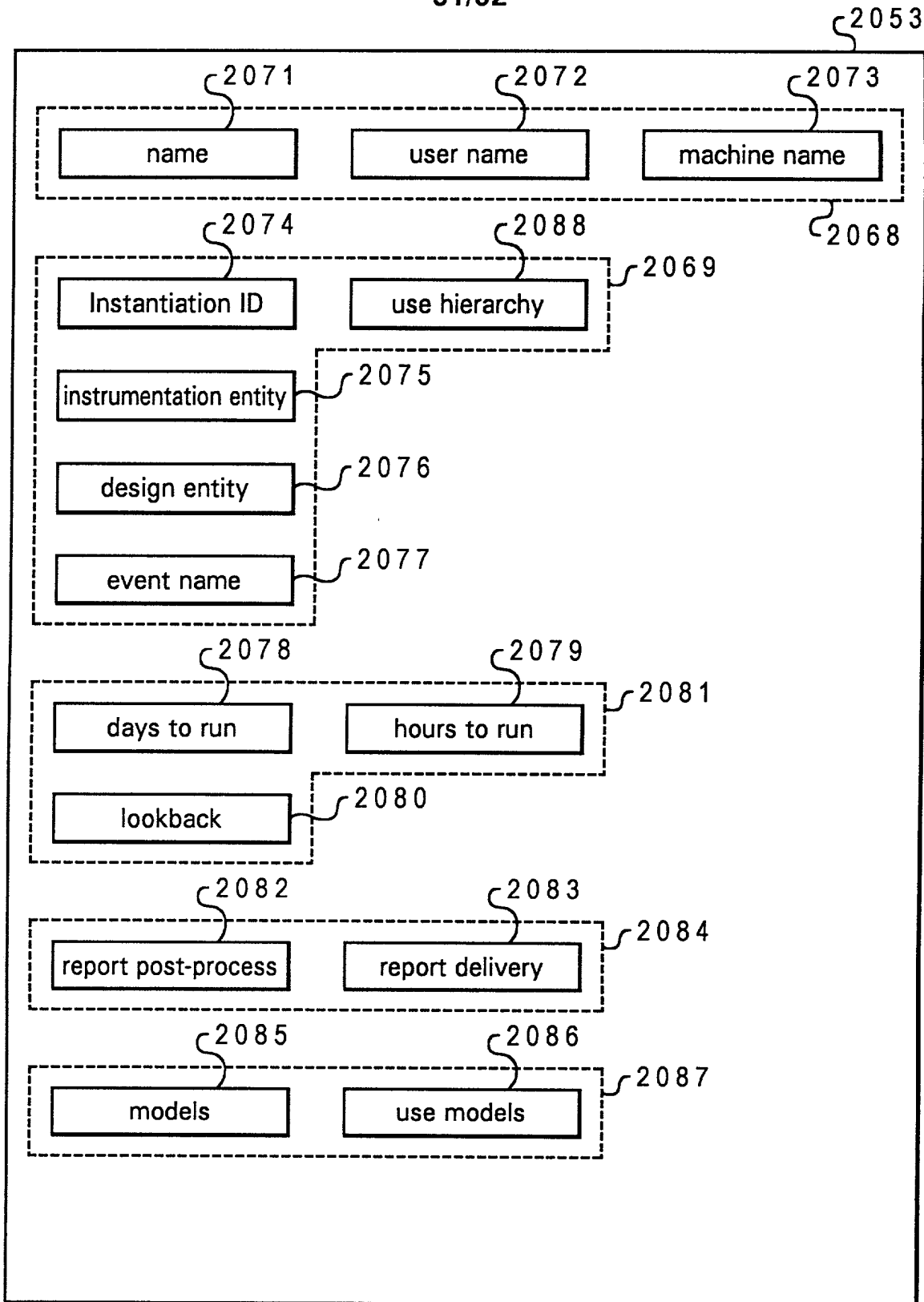


Fig. 20H

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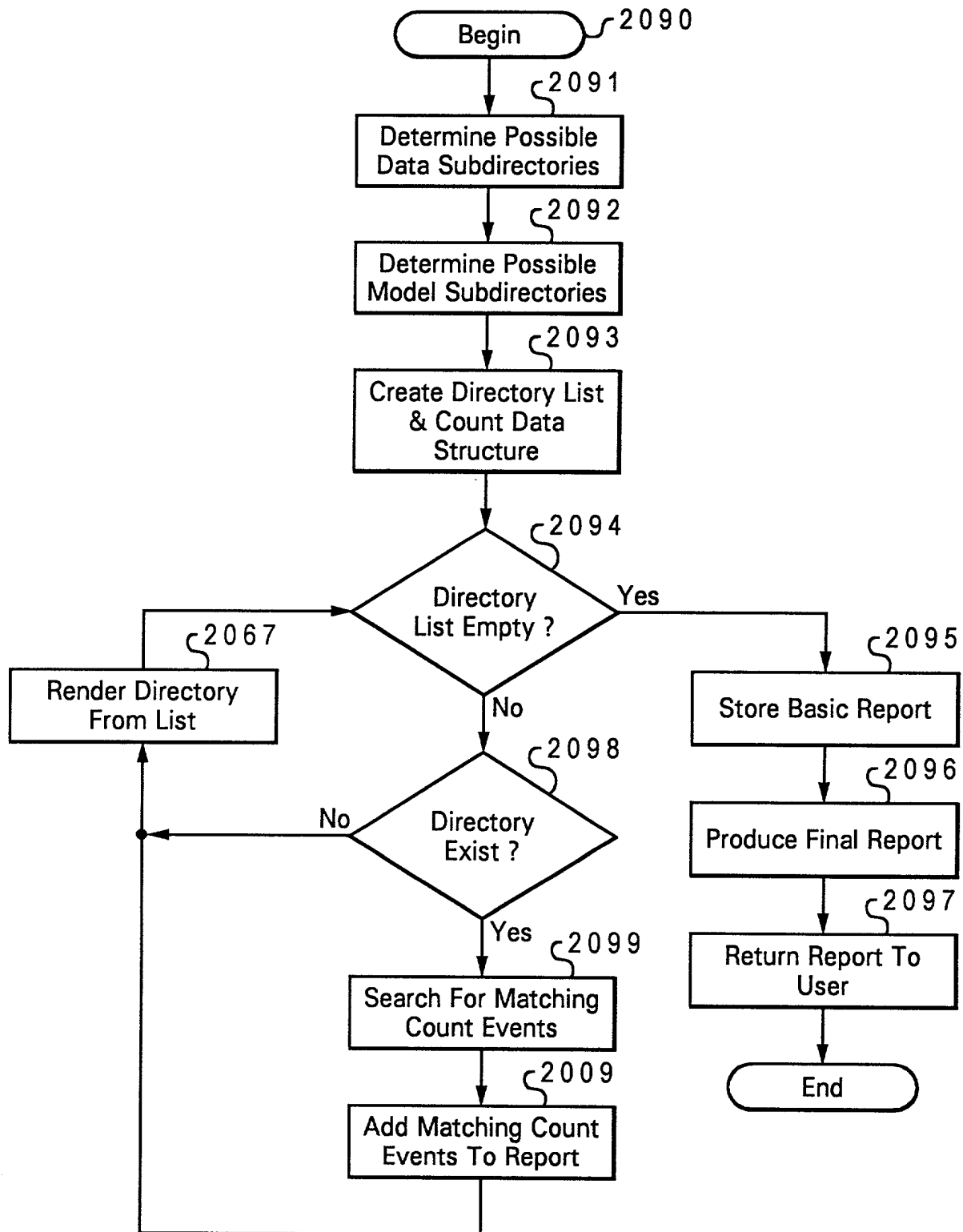


Fig. 20I

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20220720 08:56:00

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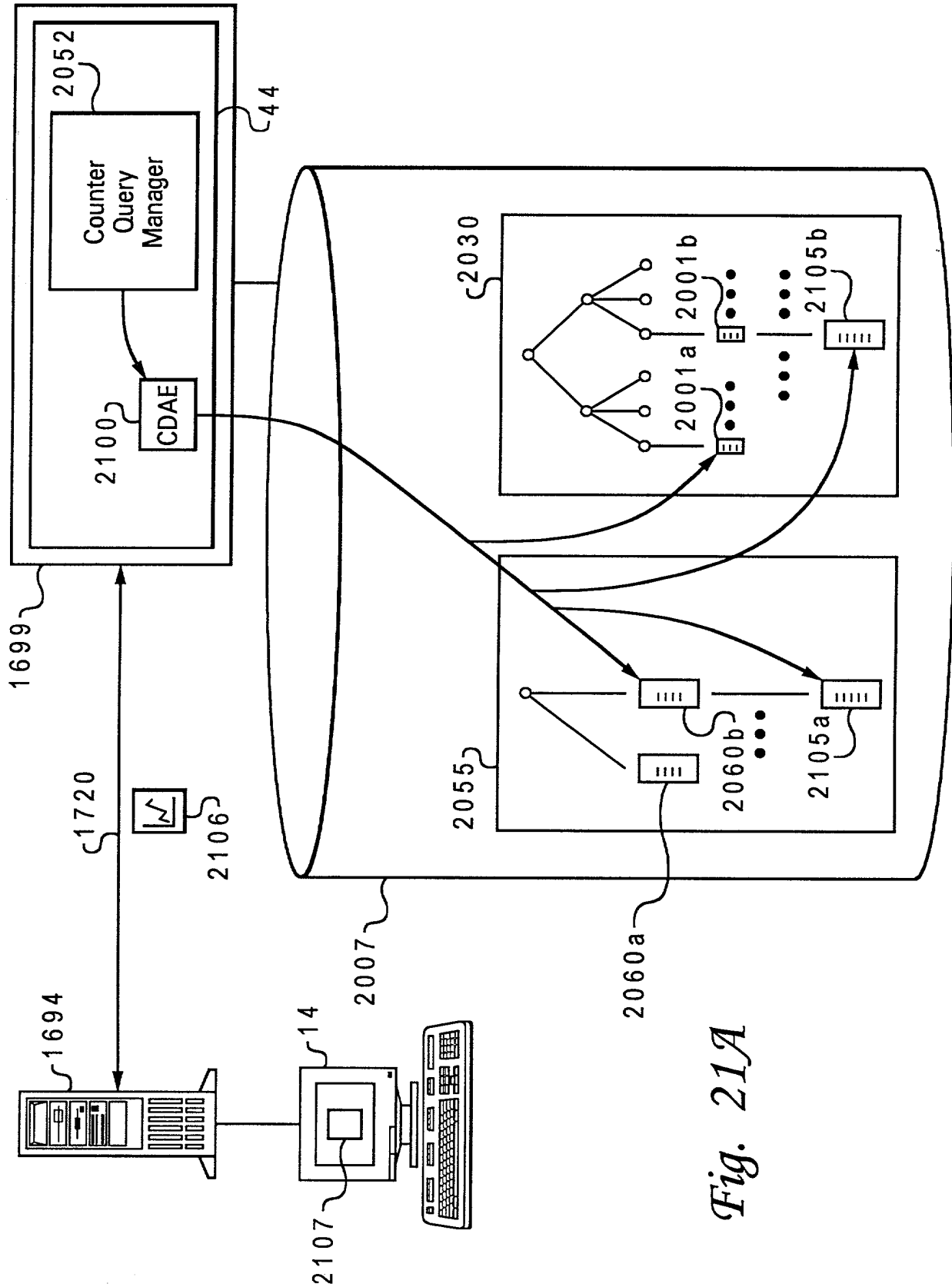


Fig. 21A

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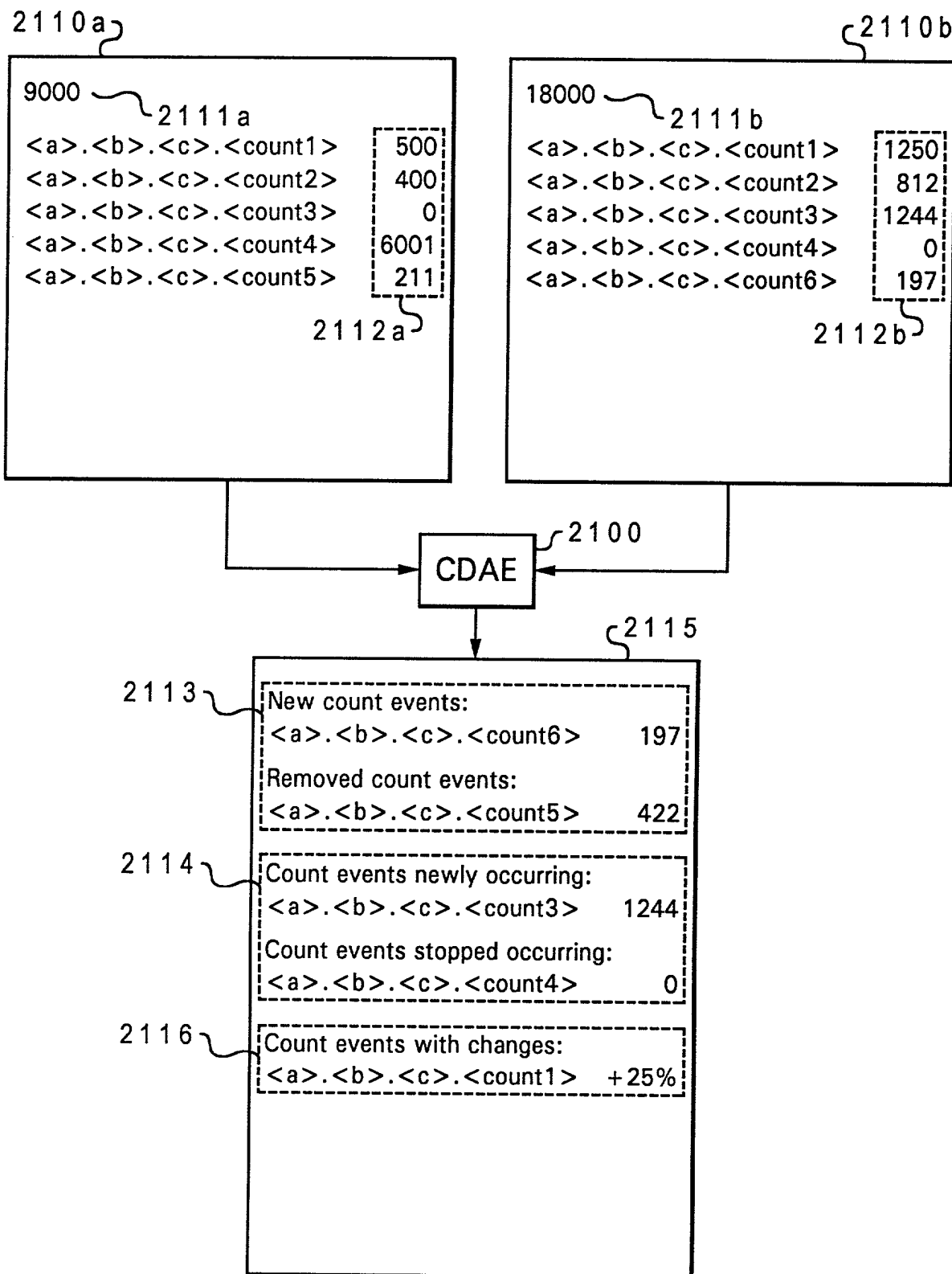


Fig. 21B

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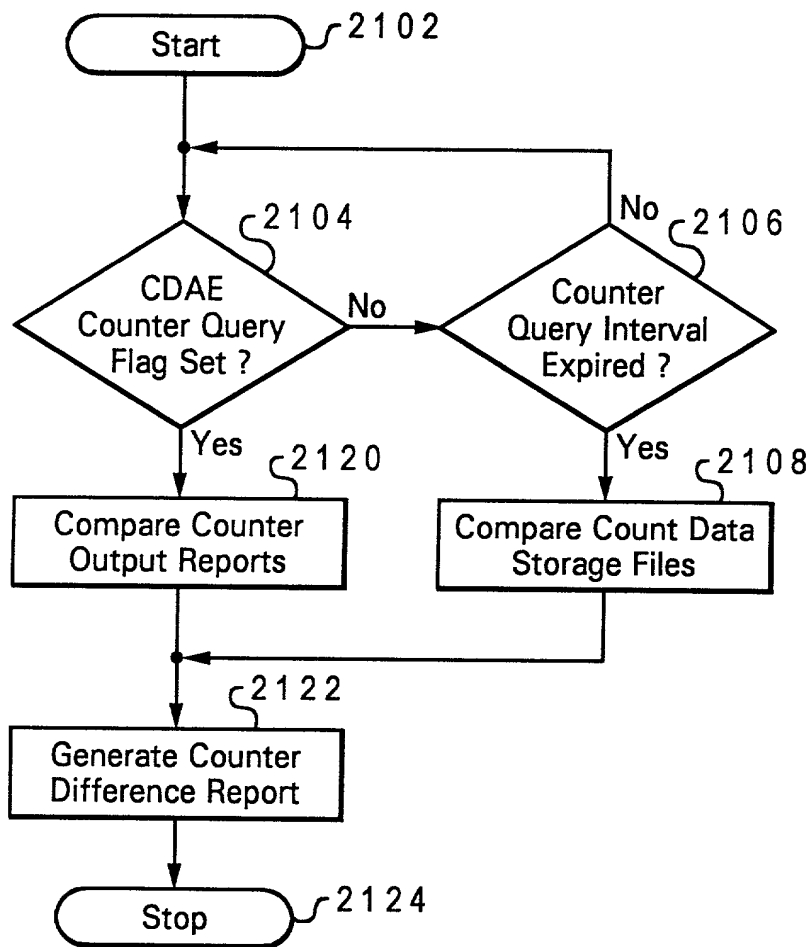
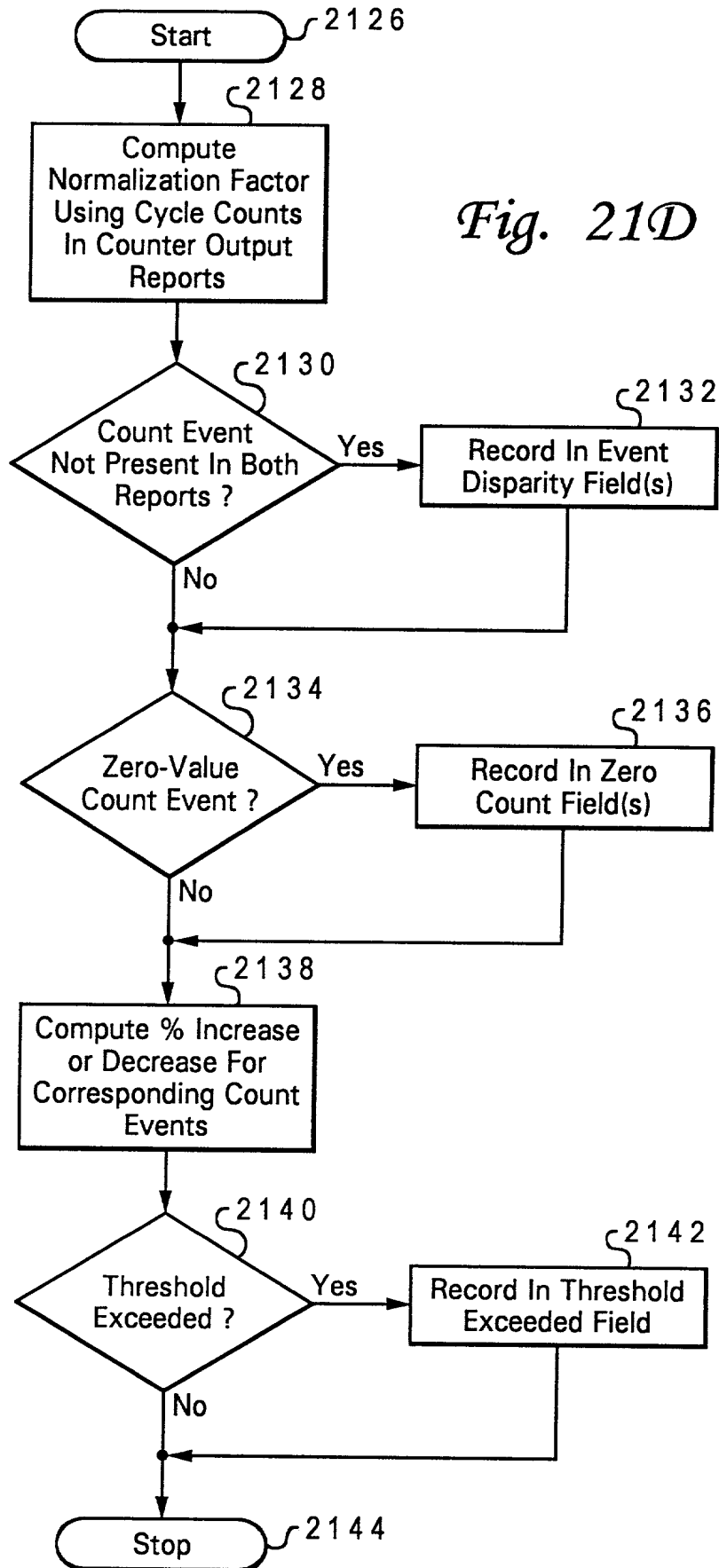


Fig. 21C



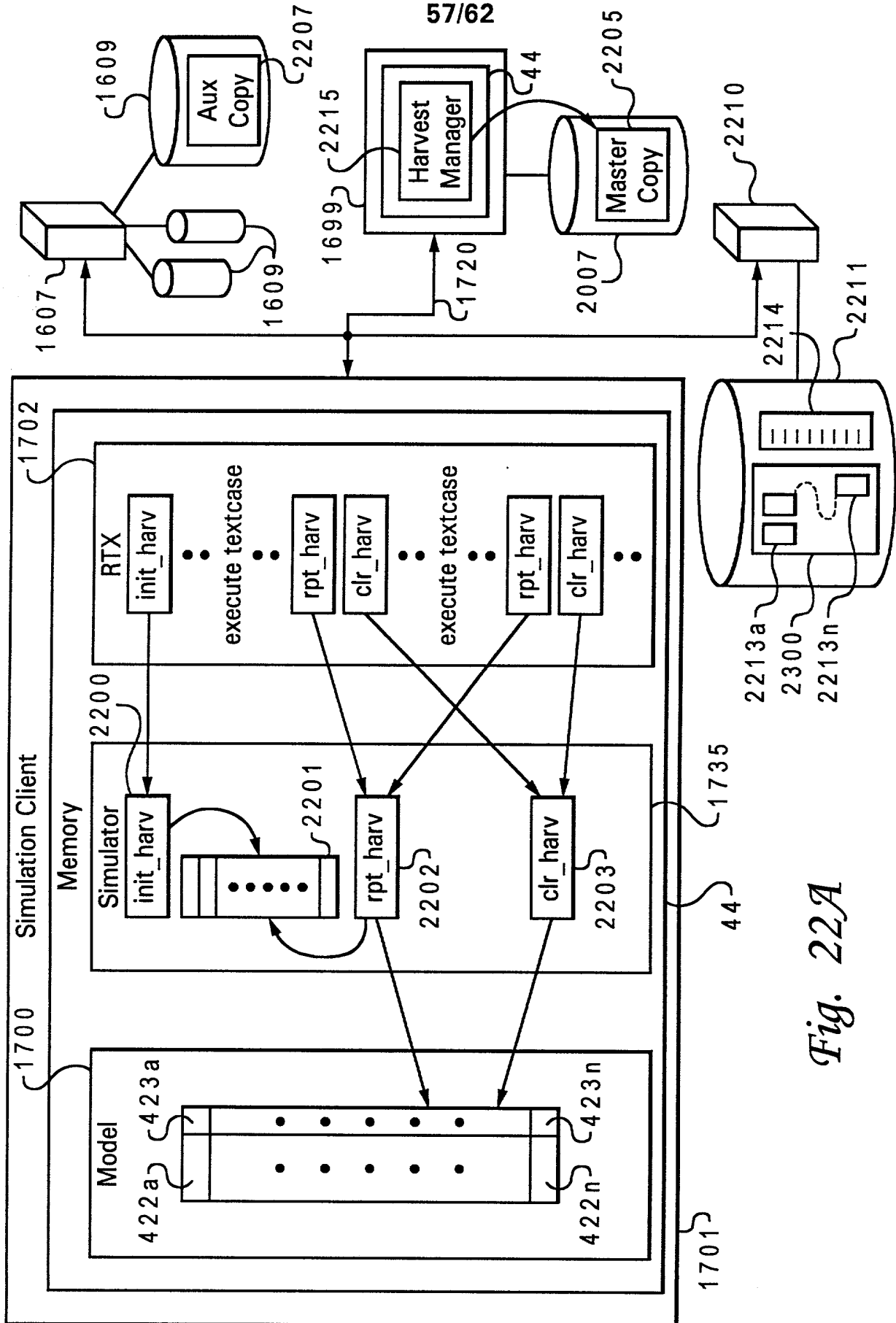


Fig. 22A

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Fig. 22B

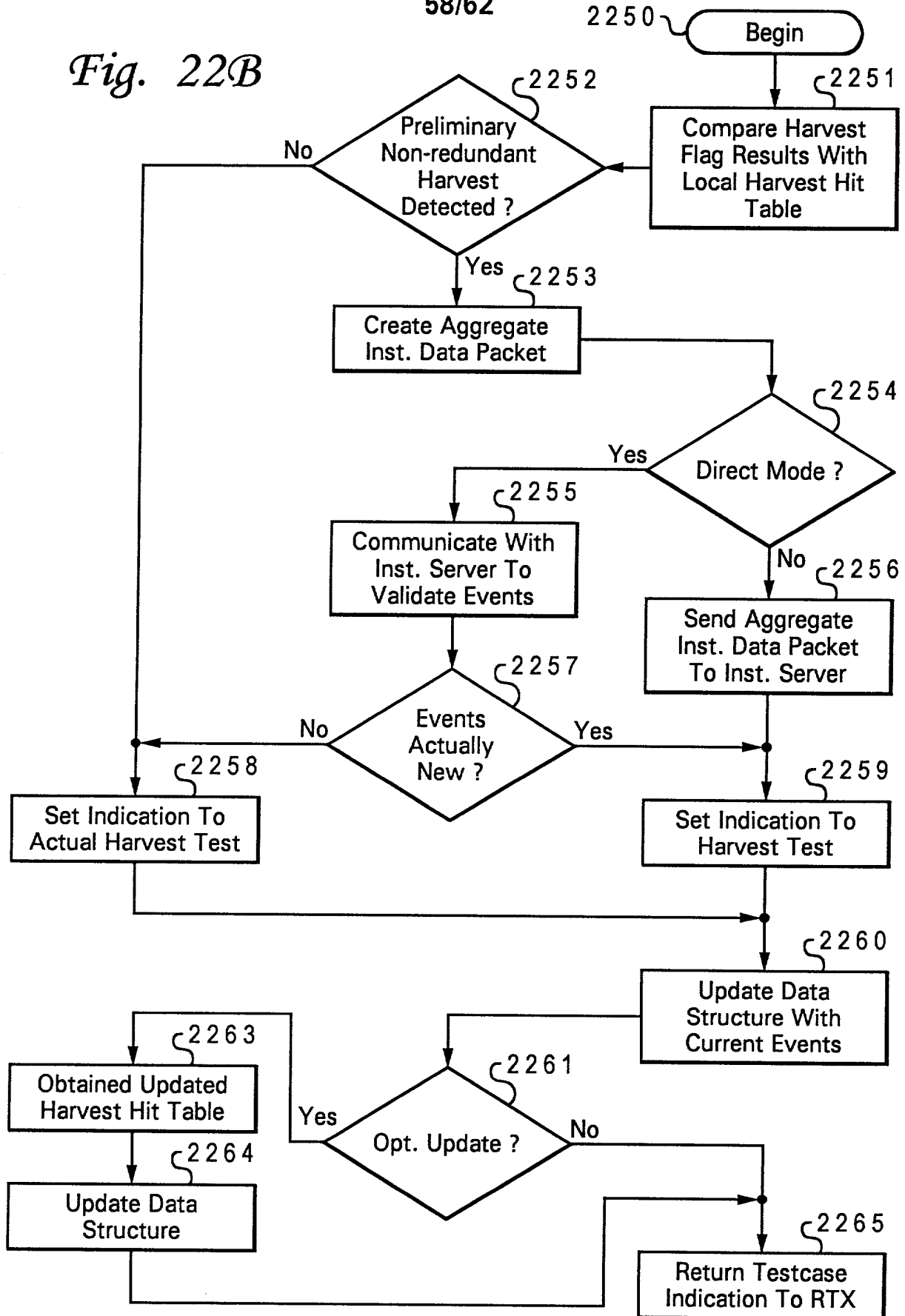
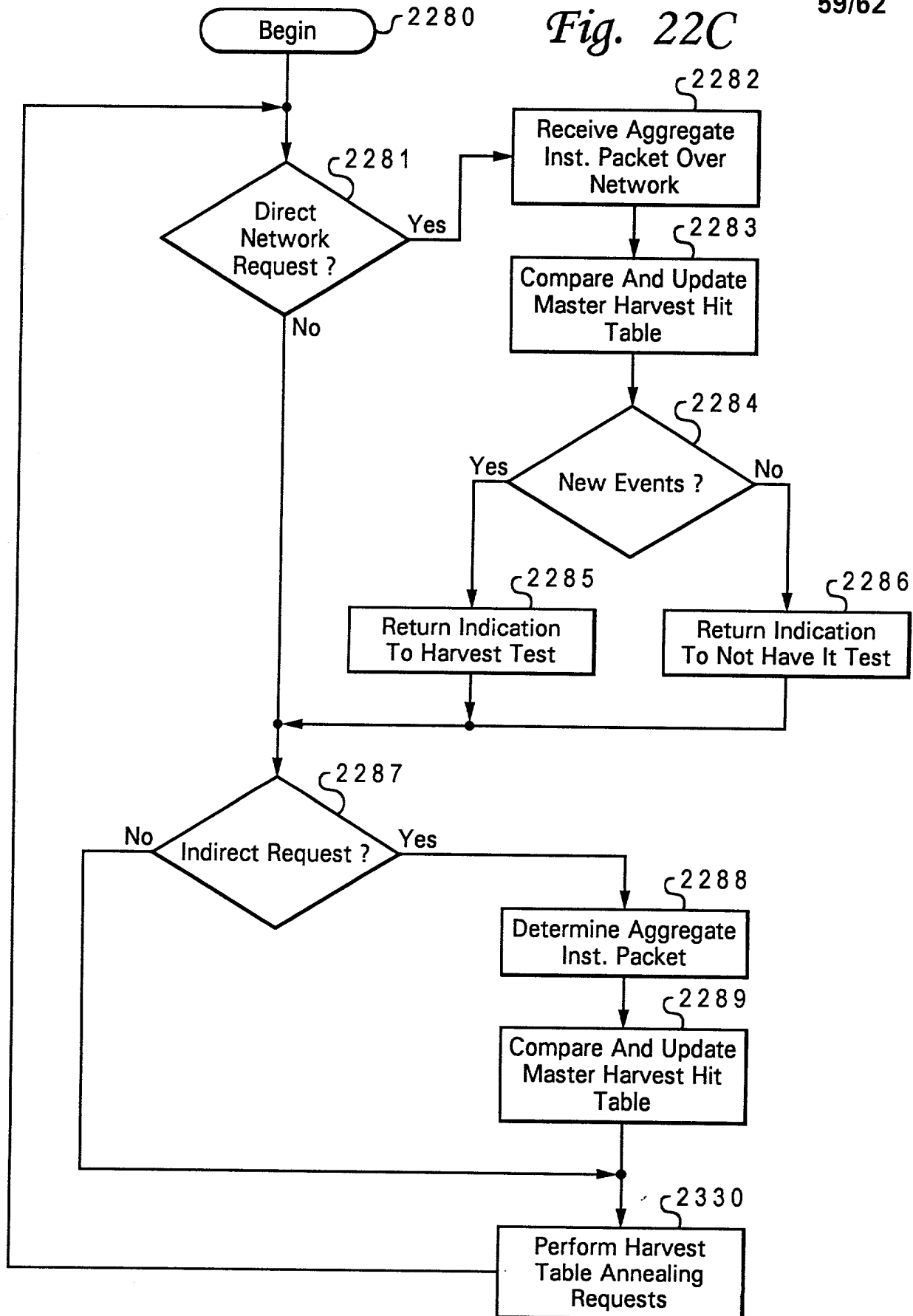


Fig. 22C



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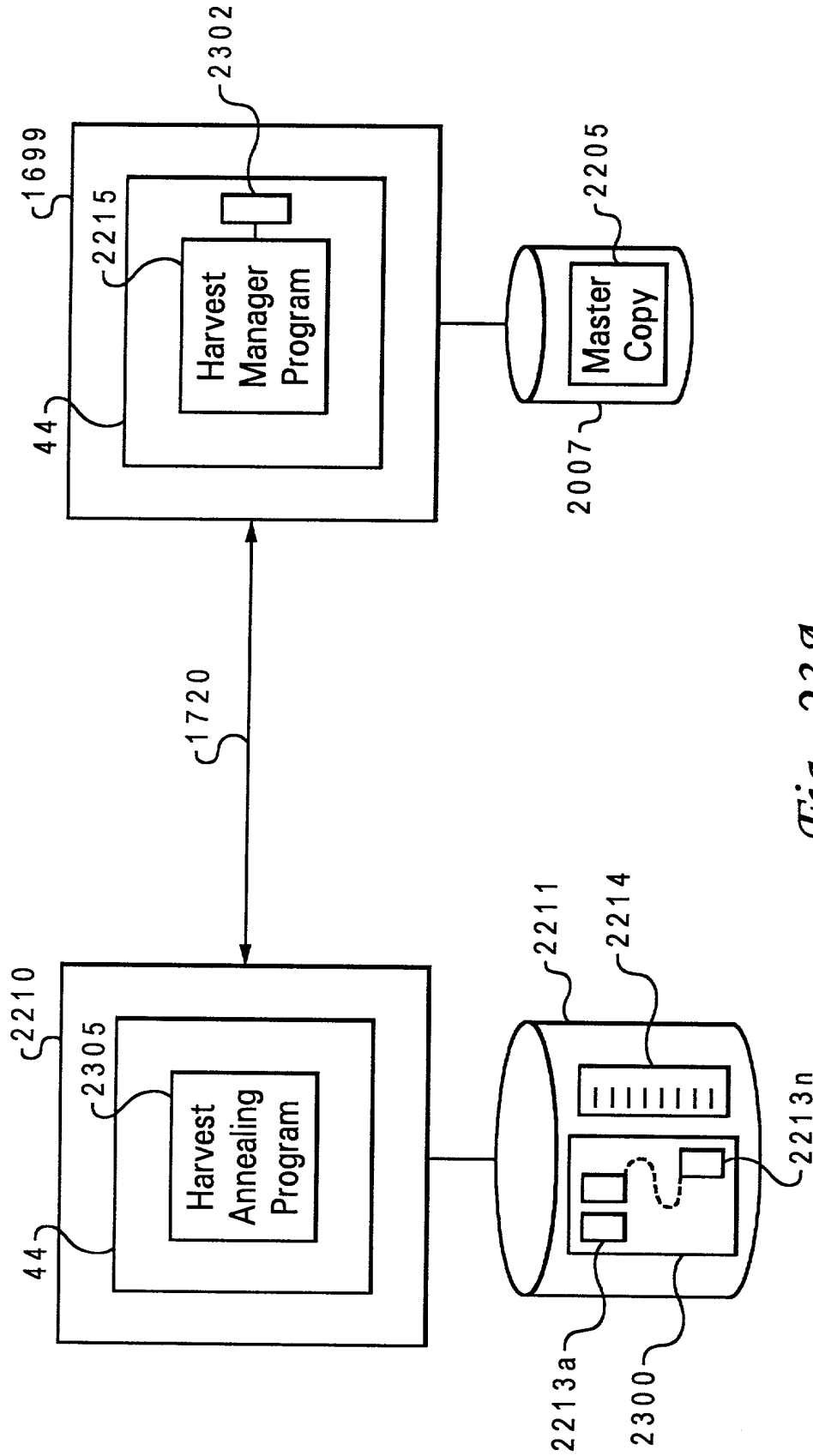


Fig. 23A

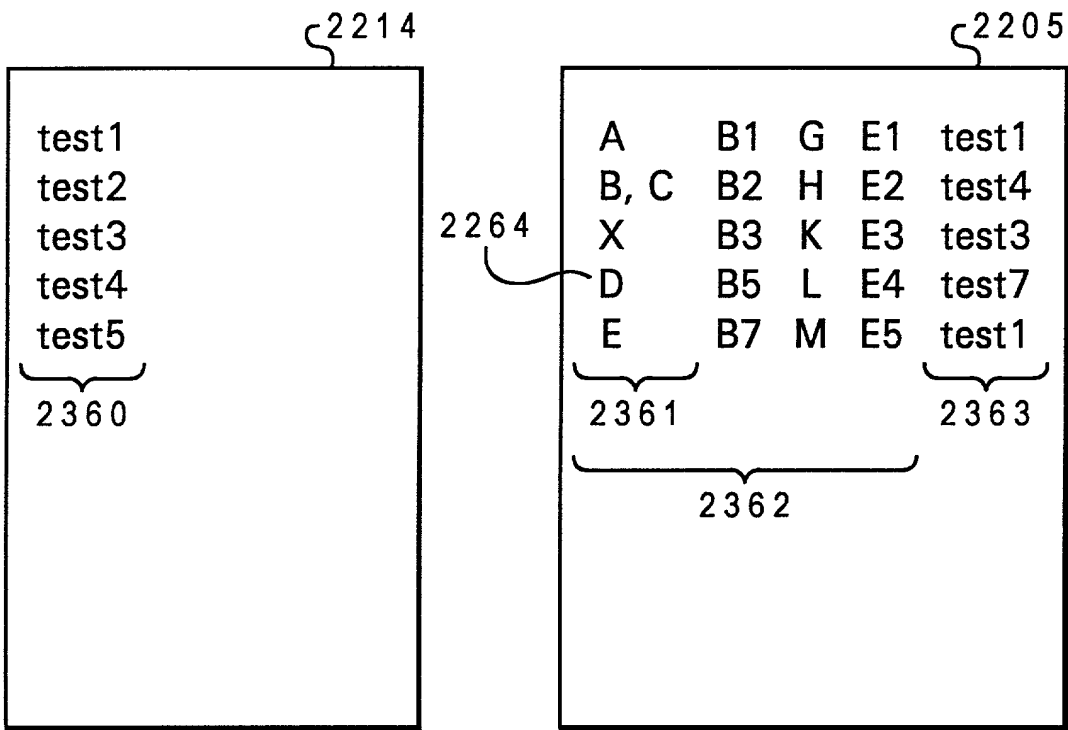


Fig. 23B

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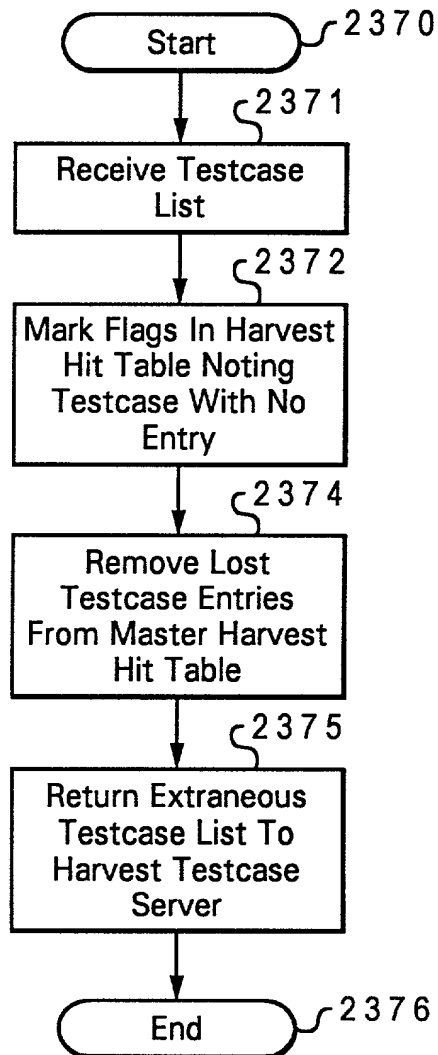


Fig. 23C

09997802-022102